

Measures taken by the Nuclear regulatory Administration on preventing of negative consequences of year 2000 problem on Ukrainian NPPs safety

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The general information on Ukrainian NPPs

Ukraine occupies the 8th place in the world on the amount of nuclear facilities and 5th place in Europe. There are 5 NPPs in Ukraine with 20 power Units, those having various design features and are at different stages of the life cycle:

Rivne NPP - 2 WWER-440 power Units and 1 WWER-1000;

Khmelnitskiy NPP - 1 WWER-1000 power Unit;

South- Ukraine NPP - 3 WWEP-1000 power Units;

Zaporozhye NPP - 6 WWER-1000 power Units

Chernobyl NPP - 3 RBMK-1000 power Units

In 1998 the power Units of Ukraine generated 75,239 million kWh of electric energy, which is about 44,9% of all electric energy produced in Ukraine.

Four Units with reactors WWER-1000 are on different construction stages. The construction work is being performed at KhNPP Unit 2 and RNPP Unit 4, the construction of two other power Units (3,4 KhNPP) was stopped.

ChNPP Unit 1 was shutdown and put on maintenance regime on November 30 1996, and on 22 December 1997 the Cabinet of Ministers of Ukraine has taken a decision on premature decommissioning of the Unit.

ChNPP Unit 2 was shutdown in 1991 after fire in turbine hall.

Besides, there are 2 research reactors in Ukraine. The Kiev reactor (VVR-M) has received permission on continuing of operation after a long lasting outage in a 1998, and the Sevastopol (IR-100) is not accepted yet to operation.

More exact, detailed data are indicated on a attachment 1.

Y2k Responsibility in the NRA

The structure of the Nuclear Regulatory Administration is presented on attachment 2.

I would like to stay on distribution of the responsibility addressing Y2k problems.

The Department of nuclear installations licensing is responsible for implementation of the Y2k program at NPPs. The Department of nuclear fuel cycle licensing is responsible for Y2k programs addressing safeguards. The Information Centre of NRA develops and implements the Y2k program at NRA headquarters and the Emergency Response Centre.

General management of Y2k activity is providing by the deputy head of NRA.

Y2k problems in Ukraine

In a nation-wide scale the Cabinet of Ministers of Ukraine has issued order #667-p dated August 17, 1998 "About measures concerning solution of a problem of negative consequences in state information systems and networks operation in connection with possible inadequate processing of dates, since a 2000 ("year 2000 problem")". Among other issues, it was ordered to the National Information Agency to develop and distribute among ministries and regional administration the recommendations concerning paths of preventing and elimination of the "year 2000 problem" negative consequences.

According to the questionnaire developed by the Agency, inventories of computer equipment and software used at NPPs in auxiliary and support divisions have been made. The Y2k related equipment have been detected, the practical steps to eliminate the possible negative consequences of "year 2000 problem" have been carried out.

The agency prepared the draft of order of Cabinet of Ministers of Ukraine, which purpose consists in formulation of a policy regarding the solution of Y2K problem, assignment of the Coordinator on the mentioned problems in scales of country. The draft is under consideration now.

NRA Y2k related activity

The discussion of Y2K problem at NRA Headquarters started from the beginning of 1998. Some period of time was required for both management and staff of the Regulatory Body to understand the responsibility, complexity and, what is very important, inevitability of the mentioned problem.

The analyzes of instrumentation and control systems (hereinafter referred to as I&C) of reactor safety system and reactor emergency protection system have shown that they are based on analogue technology and are indifferent to Y2k.

As a result of internal discussions within the Regulatory body, the Information letter for all the nuclear installations licensees (Circular # 5-NRA) has been issued July 20, 1998. It was recommended to conduct investigation of instrumentation and protection systems (I&C) of nuclear installations on serviceability and design operation at rollover of calendar dates from 20 to 21 centuries.

It was ordered to provide the information about these investigation to the NRA by July 01, 1999.

The further work addressing Y2K in NRA cause down in formulation of the tasks, which should be solved:

- How and in what kind of problem could be presented to the operated systems and equipment at NPPs (both safety and not safety related system)
- How and scale the mentioned problems address the system of distribution of electric power (Whether there is a threat of electric power system structural stability degradation and their impact on NPP safety)?
- Whether are subject to Y2K problem the NRA's computer systems (including the information system of NRA headquarters, network, communication and information systems of Emergency Response Centre, training simulator of the Main State Inspectorate on Nuclear and Radiation Safety)?

The further activity of NRA was organized in order to get a solution of these and related issues.

It was needed to reach a level of understanding of Y2K problem sufficient to prevent its undesirable manifestation. The NRA initiated dialogue with the Operating organization (National Nuclear Energy

Company "Energoatom") to insure the providing of safety operation of nuclear installations due to Y2k related issues.

To provide a necessary level of safety Units operation the NRA included the supplementary requirement to all the Annual Permissions for Unit's operation. They included the following:

- To develop the I&C lists for each Unit, possessing digital, software, and embedded systems with the function of the timing controller (including physical protection systems);
- To provide the NRA and the Main State Inspectorate with the preliminary report on the analysis of the I&C indicated in the list and information about the fulfilled and planned correcting actions a month before the Unit shutdown for outage-99 with active core reloading;
- To provide the NRA with the final report on I&C availability to face off Y2K problems, including the documents for obtaining permission for Unit start-up after outage.

The NRA proposed the National Nuclear Energy company "Energoatom" to develop and to provide the NRA with the activity's plan on solution of Y2K problems in its letter dated December, 02 1998. This plan should provide the compilation of the I&C complete lists (Unit by Unit) and their analysis on sensitivity to Y2K problems. It was proposed to develop plan so that the start-up of any Unit after outage-99 be completely "transparent" from the point of view of readiness to Y2k or to propose alternate paths of providing safe operation.

The NRA proposed to provide a detailed analysis of the I&C installed during the last years based on program-technical complexes (SGIU-M of the Czech production - Unit 1, 2 SUNPP, Unit 1 KnNPP, Information computer system based on WDPF-2 - Unit 1 SUNPP, SVRK-01-05 (06) - Unit 2, 3 SUNPP, ASUT-1000R - Unit 1, 2 SUNPP).

The NRA has begun to get results of the I&C analysis from Ukrainian NPPs concerning the impact of Y2K problems on their operation. The number of systems, which serviceability in conditions of rollover causes concern was detected.

The situation is under control of the NRA and NPPs and corporations - suppliers management.

NRA has been and continues working to provide the Y2k readiness of its computer systems. The inventory of computer equipment and software has been made. The upgrade of general use software to provide Y2K compliant has been done. The most critical from the Y2k point of view systems are as following:

- systems of remote monitoring (SDK) installed at the Emergency Response Centre
- early radiation warning system (GAMMA) installed at the Emergency Response Centre, and
- Training simulator installed at the Main State Inspectorate.

Other aspects of Y2K problem

The I&C modernization worked out for replacement of systems which operational life is carried out. When the design analogue systems are to be replaced with the digital ones, the licensing procedures, defined by the NRA, envisages the conducting of necessary control during on-line testing on the Unit.

Each Unit has emergency plan designed by the NPP technical management. The NRA expresses the opinion that the contingency plan for Y2k critical date should be developed additionally to the existing emergency plan. Shutdown of research reactors should be considered as one of the measures for the critical dates.

The NRA initiated the dialogue with management of the Ministry for Energy of Ukraine concerning measures to mitigate impact of Y2K problems to electrical power grid of Ukrainian taking account, in particular, the readiness of dispatching centres of control and distribution of electrical energy to face the Y2K.

International cooperation

The NRA and operating organizations have got a methodology assistance from United Kingdom Department of Trade and Industry. I would like to point out a great contribution in solving the Y2k problems from the side of IAEA and Nuclear Energy Agency of OECD. We also got proposals on cooperation from the US Department of Energy and the Ministry for environmental protection of Germany (BMU-GRS). We are grateful to all international organizations and separate countries and organizations, which have offered their assistance to Ukraine in the solution of Y2K problems.

Conclusion

1. The Regulatory body of Ukraine has adopted and continues adopting activities for solving the Y2k problems in order to the provide safe operation of Nuclear installations.
2. Nuclear power plants have started their Y2k programs.
3. Contingency plans development is under going.
4. It should be pointed out that the NPPs of Ukraine are at beginning on their way to solve the Y2k Problems.
5. The NRA participates the international cooperation Programs on Y2k problem.

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Nuclear Energy and Nuclear Safety of Ukrainian Nuclear Power Plants

NPP, Unit	Type of Reactor	Capacity Gross, MW	Date of commissioning dd.mm.yy	Production in 1998 MWH Gross	Capacity factor 1998 %	Lifetime on 1.01.1999 y/m
RIVNE NPP						
1	VVER-440/213	402	31.12.80	2,878,300	81.7	18/0
2	VVER-440/213	416	30.12.81	2 990 700	82.1	17/0
3	VVER-1000/V-320	1000	24.12.86	5 983 100	68.3	12/0
4	VVER-1000/V-320	1000		under construction		
ZAPORIZHE NPP						
1	VVER-1000/V-320	1000	10.10.84	5,853,000	66;8	14/2
2	VVER-1000/V-320	1000	02.07.85	5,214,100	59.5	13/6
3	VVER-1000/V-320	1000	10.12.86	5,288,700	60.4	12/0
4	VVER-1000/V-320	1000	24.12.87	6,380,100	72.8	11/0
5	VVER-1000/V-320	1000	31.08.89	6,181,300	70.6	9/4
6	VVER-1000/V-320	1000	19.10.95	6,475,700	73.9	3/3
KMELNITSKI NPP						
1	VVER-1000/V-320	1000	31.12.87	5,781,400	66.0	11 /0
2	VVER-1000/V-320	1000		under construction		
3	VVER-1000/V-320	1000		under construction		
4	VVER-1000/V-320	1000		under construction		
SOUTH-UKRAINE NPP						
1	VVER-1000/V-320	1000	22.12.82	6,502,500	74.2	16/0
2	VVER-1000/V-338	1000	06.01.85	4,785,700	56.6	13/11
3	VVER-1000/V-320	1000	20.09.89	6,175,900	70.5	9/3
4	VVER-1000/V-320	1000		under construction		
CHERNOBYL NPP						
1	RBMK-100	1000	26.09.77	under decommission		
2	RBMK-100	1000	21.12.78	under conservation		
3	RBMK-100	1000	10.11.81	4,748,700	54.2	17/1
Tota1, Ukraine:	14 Units under operation	12,818		75,239,000	67.0	

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