

**OCED/NEA INTERNATIONAL WORKSHOP on
IMPACT OF YEAR 2000 ON THE NUCLEAR INDUSTRY**

Computer Year 2000 Problems in Japanese Nuclear Facilities

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ABSTRACT

Computer Year 2000 Problem (Y2K problem) is significant one that threatens safe and stable operation of nuclear power plants. This problem must be dealt with thoroughly during the remaining limited period. The MITI, as the regulatory body of nuclear power plant, had encouraged private sectors to assure that information on the Y2K problem should be widely available and understood among them in order to address the Y2K problem in early stage. In response to this, the electric power companies had begun their activities voluntarily and comprehensively to address the Y2K problem in nuclear power plants. The MITI, recognizing the importance that the adequacy of their activities should be reviewed and reflecting the public concern on nuclear safety and international cooperation, organized a Committee to review the activities performed by electric power companies from the technical point of view.

1. Introduction

The instrumentation and control (I&C) system in operation, monitoring and control functions in nuclear power plants has been remarkably improved by incorporating computer technology. The monitoring function was improved by adopting CRT display and on-line continuous data communication network based on the distributed computer network system. As for normal operation, scheduled startup and shutdown operation was automated also by using computers, while the computerized operation guidance system for off-normal conditions was close at hands. An application of computer to the automated control system was initiated in individual minor loop control and expanded to main reactor control systems. The latest advanced nuclear power plant adopts over-all computerized system including reactor protection system. Multiple optical signal transmission was also realized by computer technology.

On the other hand, increasing percentage of nuclear electric power over the total electric power and increment of unit capacity made it essential for the electricity suppliers to keep safe and stable continuous operation of nuclear power plant. This means maintaining the functionality of computer-based systems in nuclear power plants is essential factors and the incident potentially caused by Y2K problem in nuclear power plants must be thoroughly prevented in this context.

2. Government Program on Y2K problem

2.1 General description

The MITI's activities to electric power companies had been as follows;

- (1) to send an administrative letter of the Minister of MITI to the Federation of Electric Power Companies to heighten an awareness of the Y2K problem,
- (2) to investigate the status of the activities performed by electric power companies through questionnaire, and
- (3) to hear the progress of the Y2K program of them.

Meanwhile, the Government issued National Y2K Action Plan at September 1998, which was established by the initiative of Prime Minister, who had a strong concern over information technology. The MITI, based on the Action Plan, had strengthened the system for review and follow-up of the activities performed by electric power companies.

The National Y2K Action Plan says "the energy-related industry, being a sector crucial to society's functioning as well as the finance, telecommunications, transportation and medical care, should be encouraged to thoroughly address the Y2K problem. Specifically, this means taking the initiative in conducting over-all check-ups, including simulation tests, contingency planning and provision of information as well as reporting to competent Ministries".

Though the activities addressing the Y2K problem in any facility should be carried out under owner's responsibility in general, the MITI developed comprehensive program reflecting the Y2K Action Plan and asked energy-related industries to conduct their voluntary check-ups. Furthermore the MITI asks electric power companies to report their progress periodically for assembling them to make public and developing the additional activity if necessary.

* Internet site : <http://www.miti.go.jp> (Japanese, English)

Especially for the nuclear power plants, the MITI organized Review Committee on Computer Year 2000 Problems in Nuclear Power Plants in order to assure the completeness of the activities addressing the Y2K problem performed by the electric power companies. The Committee, being managed by Nuclear Power Engineering Corporation, technical support organization to the MITI, consists of experts of I&C system in nuclear power plants and experts of computer technology, who will review them from the technical point of view.

Today, public concern on Y2K problem is strong and the potential impact caused by the failures in addressing the Y2K problem would be fatal to social activities. This should be recognized.

2.2 Activities of Y2K Review Committee

The Y2K Review Committee is expected to perform the activities aiming at maintaining safe and stable operation of nuclear power plants, as the mission of the Committee is to support the regulatory activities of the MITI.

The scope of the Committee's investigation includes I&C systems described in "Review Criteria of Safety Classifications in Japanese NPPs" and the systems and components important to safe and stable continuous operation of nuclear power plant.

The contingency plan also will be reviewed by the Committee.

I. Activities performed by electric power companies

There are 10 electric power companies that possess nuclear power plants in our country and 51 units are under operation. Based on the information assembled through questionnaire and hearing, the status of the activities performed by electric power companies are as follows:

(1) General evaluation

- Each company had established the organization addressing Y2K problems headed by the vice president.
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- They are paying efforts to make the information on the Y2K problem public through Internet homepage, as well as to report to regulators.

(2) Evaluation of computer-based systems used in nuclear power plant

- The systems for control function were assured that they were not affected by the Y2K problems because ;
 - those systems are not operated by the digital computer, or
 - those systems do not use date stamp nor date execution even when computer is used.
- There are some computer-based systems that use data stamps or date execution, but not directly affect the safety function of the plant. These systems should be remedied. At present, electric power companies are paying great efforts to perform the corrective activities one after one, aiming these activities should be completed prior to January 1, 2000.
- About 81 percent of the systems important to safety and stable continuous operation have been remedied to date. The large part of the remaining will be completed prior to this July.

(3) Future activities

- There are few plants whose corrective activities are scheduled to be done after this July owing to the scheduled outage of the plant. But they have the confidence to complete these activities prior to January 1, 2000.
- As for the contingency plan, the electric power companies had already prepared every kind of plans for the environmental factors such as typhoon or earthquake, and trained the staff for these situations. Nevertheless, they are trying to prepare the additional company-wide contingency plans for the Y2K problem till this July.

II. Conclusion and continuous effort

The MITI, as the regulatory body of nuclear power plant, recognized the importance that the activities performed by electric company should be reviewed and the completeness of these activities should be assured. The MITI paid great effort to assure that the completeness of these activities were appropriately achieved in order to keep the safety of nuclear power plants.

At present, the MITI recognizes that the activities addressing the Y2K problem in electric power companies have been carried out on schedule, and the MITI also has a confidence that those remaining activities should be completed prior to January 1, 2000.

Attachment (1) Government Y2K Action Plan

Attachment (1) Government Y2K Action Plan

(As adopted by the Advanced Information and Telecommunications
Society Promotion Headquarters on September 11, 1998)

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The "Y2K problem" is the risk that computer systems may malfunction if their programs fail to recognize dates after the year 2000. This is an enormous and urgent problem as it may shake confidence in the establishment of highly advanced information and telecommunication infrastructures in the 21st century and must be dealt with by a definite deadline.

Today, with less than 500 days to the year 2000, both government and private sectors need to take all possible measures to deal with the problem as quickly as possible.

Considering the importance and urgency of this problem, H.Q. decided Y2K Action Plan and asked both government and private sector to cooperate to implement it.

At the same time, because the Y2K problem affects other countries as well and has considerable potential cross-border impact, we will also promote international cooperation to tackle the problem.

I. Promoting Y2K awareness

1. H.Q. will work with local governments and private sectors to heighten public awareness of the Y2K problem, to minimize the possible risks in the year 2000, and to ensure a smooth transition into the new millennium. HPAIS will thus widely provide information on what can be done and what are actually being done on this Y2K problem and will work with the public and private sectors to ensure that everyone is fully informed on Y2K measures.
2. In seeking to ensure that this information is widely available and widely understood, H.Q. will not only call for general cautions but also thoroughly inform all concerned parties that the appropriate way to tackle the Y2K problem is to ensure implementation of following measures:
 - (1) To clarify the organizational lines of authority and responsibility and to ensure that the entire organization is able to respond.
 - (2) To conduct extensive testing, including simulation tests in order to make sure that the entire system is able to function without problems, as well as to set up contingency plans so as to be prepared for possible system shutdowns, malfunctions, and other contingencies.
 - (3) To check not only the computers and software but also all of the equipment with embedded microcomputers. To confirm that all the partners connected through computer network are taking appropriate measures.
 - (4) To inquire of manufacturers and vendors of computers, software, and microcomputer-embedded equipment whether the products and the systems are Y2K compliant.
 - (5) To provide information on the progress etc.

II. Measures to be taken by the Central Government and Requests for Local Governments

1. Measures to be taken by Ministries and Agencies

- (1) All Ministries and Agencies will take necessary measures in line with the Y2K Conversion Guidelines (Appendix 1) including implementation of final and thorough checkups, including simulation tests setting up contingency plans. These measures are aimed to avoid impacts of Y2K problem on their computer systems and to ensure that daily lives of Japanese people will not be affected.
- (2) In principle, all Ministries and Agencies will complete their simulation tests on systems with high priority that are directly related to daily lives of Japanese people (hereinafter called priority systems) by the end of June 1999.
- (3) All Ministries and Agencies will set up contingency plans explicitly covering the possibility of computer and other system shutdowns, malfunctions, and other contingencies for all priority systems on January 1, 2000.

All Ministries and Agencies will report their progress to the Management and Coordination Agency (MCA) quarterly. The MCA will collect the results and release them to the public.

2. Guidance and Requests for the Special Corporations

- (1) All Ministries and Agencies will instruct and request the special corporations under their jurisdiction which are running systems directly affecting peoples' lives as well as other special corporations doing work for the government to conduct thorough tests, including simulation tests and to set up contingency plans in line with the Y2K Response Guidelines.
- (2) All Ministries and Agencies should report the progress being made by the special corporations under their jurisdiction to the MCA quarterly and the MCA should collate the results and release them for public consumption.

3. Requests for Local Governments

- (1) The Ministry of Home Affairs will call upon all local governments to implement responses following the Y2K Response Guidelines as adapted to their situations.
- (2) The Ministry of Home Affairs will survey quarterly the local governments on their progress, collating the results and releasing them to the public.
- (3) The Ministry of Home Affairs will extend an active support to the local government's efforts.

III. Measures for the Private Sector

1. Measures for the Private Sectors of Particular Importance

The competent Ministries and Agencies will encourage the finance, energy, telecommunications, transportation, medical care sectors crucial to society's functioning to thoroughly address the Y2K problem. Specifically, this means taking the initiative in conducting over-all checkups, including simulation tests, and provision of information as well as reporting to the competent Ministries and Agencies.

- (1) The competent Ministries and Agencies will call upon corporations in the critical sectors owning and running related systems (hereinafter the critical-sector corporations), either directly or through their industry associations, not only to make sure that everyone is thoroughly aware of the Y2K problem but also to conduct independent checkups of their own accord, including conducting simulation tests, setting up contingency plans, and making information on their responses available on the Internet and elsewhere, in line with the Private Industry Y2K Check List (Appendix 2).

With respect to the simulation tests in particular, these are to be completed, insofar as is possible, by the end of June 1999.

- (2) The competent Ministries and Agencies will call upon these critical-sector corporations to report quarterly on the progress made in their independent testing and should then collate these reports and make the results available to the public.

2. Reaching out to Industry

- (1) Along with seeking to ensure that the industries under their jurisdiction are fully aware of the Y2K problem, the central government Ministries and Agencies will encourage all corporations to conduct independent checkups at their own initiative in line with the Private Industry Y2K Check List.

- (2) The competent Ministries and Agencies will make a special effort to ensure an unstinting response when it is considered likely that a failure to take appropriate Y2K action could have major ramifications, as when private industry systems could physically endanger others or when the systems are widely linked to outside systems and networks.
- (3) The competent Ministries and Agencies will collect information quarterly on how the industries under their jurisdiction are actually dealing with the Y2K problem and will release the results available to the public.
- (4) The competent Ministries and Agencies will encourage the manufacturers and vendors of computers, software and microcomputers-embedded equipment to provide information how they are responding to the Y2K problem to the Japanese and, when appropriate, the international public.

3. Support for Small and Medium Enterprises (SMEs)

To promote responses by those SMEs that might otherwise find it difficult to respond in a timely manner, education, guidance, and support will be provided with a view to enhancing the consciousness of the management of SMEs through the SME leadership organizations and other bodies. Efforts will also be made to promote wider use of such current measures as those for providing the necessary financing and other support. SMEs can consult the SME Regional Information Center about the Y2K problem.

Efforts will be made to acquire information on their progress quarterly and to release the results to the public.

4. The Anti-Monopoly Law and information exchange among corporations and through industry organizations on the Y2K problem.

- (1) Dealing with the Y2K problem requires efforts by corporations, and industry organizations to prevent computer malfunctions. As a part of such effort, they may exchange technical information on how to improve computer systems, the results of improvements and tests, etc. without causing problems in terms of Anti-Monopoly Law.

That being said, any act of abusing a position of power within a commercial relationship that restricts competition under the guise of dealing with the Y2K problem will be dealt with harshly under the Anti-Monopoly Law.

- (2) The Fair Trade Commission will be available for consultation on whether or not specific actions by specific corporations, industry organizations, or other bodies in response to the Y2K problem are likely to run afoul of the Anti-Monopoly Law.

IV. Establishment of a System to Provide Information

1. Each Ministry and Agency will designate liaison staff for Y2K issues and work to promote information disclosure. Along with creating a home page by the end of September 1998 to provide the general public with information about its own efforts to deal with the Y2K problem and the efforts of industries under its jurisdiction, Ministry and Agency will also update the page with new information as it becomes available and make an effort to ensure that the necessary information is accessible.

2. In an effort coordinated by the Cabinet Secretariat, the Ministries and Agencies will seek to use the Internet and other means in constructing an information disclosure system and to make information about the government's own efforts widely accessible.

The Prime Minister's Office has thus established a home page (<http://www.kantei.go.jp>) with a section on the Y2K problem. Links will soon be established with the Ministries and Agencies, and information on how the Ministries and Agencies, local governments, private-sector bodies, corporations, and other organizations are coping with the Y2K problem will be made widely available in a user-friendly way.

V. Follow-up to the Action Plan

1. Reports on the progress of implementation of the Action Plan will be submitted quarterly to the Y2K Advisers' Conference and to the Conference to Promote Y2K Measures made up of Vice-Ministers level officials in order to ensure the appropriate responses.
2. The H.Q. will also be convened as necessary to conduct follow-up to the Action Plan, to assess the public and private sectors' responses to the Y2K problem, and to encourage the appropriate responses to this issue.