

The French Nuclear Safety Authority

**(DSIN)
point of view
on Y2K problems**

The French nuclear safety Authority point of view on Y2K problems

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Y2K and nuclear safety

Y2K risk in general

- ⇒ The origin is the treatment of a "00" date compared to the previous "99" date in software systems.
- ⇒ The failure may occur at the first time a date "00" is used (before 1 january 2000, at this moment or later)
- ⇒ The consequences depend on the design of the system, its missions and its environment.
- ⇒ The potential result may be a clear or unclear failure, or bad results and inappropriate action.
- ⇒ The potential impact may be unavailability, disorganization, up to serious safety problems if Y2K issues are poorly managed.
- ⇒ Risk of simultaneous failures: Y2K as a risk of common cause of failure.
- ⇒ Complexity of investigations

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Y2K risk in PWR

➤ Internal risk

⇒ due to potentially impacted equipments and systems of the plant

- systems linked to the process or to the safety actions
- systems used for technical and non technical management
- systems linked to physical or radiological protection

➤ External risk

⇒ Due to the impact of Y2K failures external to plants

- General loss of the power distribution network
- Loss of telecommunication networks
- Disorganization of external activities...

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Y2K risk in PWR

➤ French case

- ⇒ Most of the electricity supply is nuclear based
- ⇒ Electricity production relies upon a single utility (EDF)
 - concentration of means to face the Y2K problem
 - necessity of more attention to common mode of failure
- ⇒ This utility is the responsible for the power network
 - advantage for management of prevention and mitigation of a general loss of the power network

The French nuclear safety Authority point of view on Y2K problems

A defence-in-depth approach
to make sure that, in no circumstance, could
any occurrence of the year 2000 problem
weaken
the safety level of any
NPP or nuclear plant
or nuclear research facility.

The French nuclear safety Authority point of view on Y2K problems

In 1998, the French safety Authority addressed the utilities (nuclear plants, research installations and nuclear power plants) an enquiry on their involvement in Y2K

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French Safety Authority requirements

➤ Identification of the risk

- ⇒ Internal risk due to anomalies in systems and equipments of the nuclear power plant.
- ⇒ External risk due in particular to a general loss of the power distribution network.

➤ Prevention

- ⇒ Identification of every potentially impacted systems inside the NPP, examination of the impact, strategy of correction.
- ⇒ Preparation in order to get ready to face external failure.

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French Safety Authority requirements

- Mitigation of potential consequences

- ⇒ organisation of the means and of the exploitation in order to face

- residual failures internal to a power plant or a nuclear installation
 - consequences on the power plants and nuclear installations of external failure

Y2K and nuclear safety

Information to be provided by utility to the S.A.

➤ Software and programmed systems approach:

An inventory of safety systems and of all other systems related to plant operation likely to be affected by year 2000 problems. An impact analysis of Y2K on these systems.

The methodology for identification of the components or software parts to be modified. The methodology for corrective actions and V&Vs.

An analysis of the consequences of Y2K problems, should they appear before the necessary corrective actions be implemented. A presentation of the mitigation measures envisioned in such scenarios (eg., specific emergency procedures).

The agenda of the corrections, modifications, and of the corresponding V&V processes on the different systems.

Y2K and nuclear safety

Information to be provided by utility to the S.A.

➤ **Functional approach**

- ⇒ Identification of external risk
- ⇒ Definition and agenda of the set up of dedicated mitigation measures as a supplementary step in the defence in depth.
- ⇒ Actions in order to set the nuclear installations in particularly robust states before Y2K
- ⇒ Ensure that stronger failure hypotheses can be covered by the safety demonstration or specific operating measures
- ⇒ Sensibilisation and preparation of the operating and maintenance teams to the potential risk

Y2K and nuclear safety

State at the beginning of 1999

- EDF strategy to cope with Y2K on French NPPs
 - ⇒ A dedicated project team dealing with Y2K since 10/97.
 - ⇒ Internal risk- 7 fields handled:
 - I&C / protection systems
 - I&C / process
 - important off site computer codes (calculation of core loading, protection system parameters etc.)
 - emergency communication network
 - software systems used for plant and personnel management
 - computerized maintenance tools
 - training simulators
 - ⇒ An approach based on identification, analysis, corrective measures, supplemented by mitigation measures
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Y2K and nuclear safety

State at the beginning of 1999

⇒ External risk

- Defence in depth against loss of power network
- Specific analysis of the loss of power network due to Y2K

⇒ Identification actions consolidated

- A consolidated identification list with impact studies is established
- A diversified identification action based on a functional approach as been launched as a cross-check exercise

⇒ Preventive actions in progress

- Implementation of certain systems already done
- Comprehensive agenda for implementation under finalisation
- End of implementation of corrective actions on site planned for september

⇒ Definition of mitigation actions in progress: target 1st semester 1999

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Action of the French Safety Authority in 1999

➤ What

- ⇒ Due to the nature of the problem and the delay, the control of Safety Authority cannot be based only on the result. It must exercise closely on the process.
 - The assesment concerns the general strategy, the delays of realization of the phases, the implementation of corrective actions on sites, the application of mitigahon measures on the reactors and plants.

➤ How

- ⇒ Every 3 months technical meetings
 - ⇒ Dedicated reports or procedures to be transmitted by EDF
 - ⇒ Special technical meetings and audits in central services and suppliers services
 - ⇒ Site inspections
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Y2K and nuclear safety

Action of the French Safety Authority in 1999

➤ Agenda

- ⇒ April 1999: *special meeting of French reactor expert group (GPR) on EDF Y2K methodology and advancement status of Y2K actions*
- ⇒ July 1999: *EDF strategic target for Y2K corrections implementation and for assesment of contingency planning*
- ⇒ Sept. 1999: *Y2K report, including continency planning, transmitted to Safety Authority*