

**OECD/NEA International Workshop -**  
**« IMPACT OF THE YEAR 2000 ON THE NUCLEAR INDUSTRY »**  
**Ottawa 8-10 February 1999**

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**THE ELECTRICITÉ DE FRANCE RESPONSE TO THE YEAR 2000 CHALLENGE**

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**INTRODUCTION**

*“EDF, in its quest for excellence, wants to go beyond the year 2000 maintaining the same high level of safety: as much as regards nuclear safety as ensuring the continuity of customers’ supplies”*

**The EDF response to the Y2K issue, as regards its double mission, i.e. nuclear safety and safety of the electrical power system: A DEFENCE-IN-DEPTH STRATEGY**

1. **A systematic analysis** has been performed for all I&C and computerized plant systems in order to detect possible Y2K impacts. These analyses were more or less in depth according to their importance for nuclear safety, industrial safety, the environment and availability.

Each impact identified - without any exception - is being remedied.

Telecommunications and all software systems linked with NPP or grid operations are treated in a same manner.

The present status of this phase is:

- the analysis has been completed,
- the treatment:
  - preparation of corrective actions and trial implementation (deadline mid-'99)
  - implementation in every NPP (deadline September '99)

Generic I&C and software are dealt with by EDF corporate departments and by manufacturers. Site-specific software systems are treated directly by the NPPs, with regional engineering services support.

2. **A functional risk analysis** is also performed for complete plant systems related to:

- nuclear safety (e.g. reactor protections, safety-related systems),
- plant availability (e.g. main turbine generator protection system),
- house load operation capability (e.g. load reduction and turbine bypass systems),
- plant re-powering capability.

This analysis, conducted with a different approach, is redundant with the phase 1 analysis.

The Y2K impacts identified are communicated to the phase 1 experts for treatment within the frame of phase 1.

(deadline February '99)

- \* **A specific risk analysis of the Complete Grid Failure** occurrence and consequences is conducted jointly by the EDF NPP Operations division and the Transmission division.

The development is composed of three steps:

1. Analysis and evaluation of generation/consumption imbalance risks:
  - because of several NPP shutdowns due to a common mode failure,
  - because of generic grid failures,
  - because of brutal and massive customer disconnection creating a power transient on the grid (major industrial customers are questioned about their operation mode at the Y2K time).
2. Development of a strategy to resist to power transients:
  - NPPs house load operation capability,
  - adequate grid and plant turbine generator setting point margins.
3. Development of a response to complete grid failure risk:
  - identification of possible complete grid failure impact on safety, and correction as necessary,
  - grid reconstruction capability (i.e. NPPs re-powering by hydroelectric plants).

(deadline May '99)

3. **A risk management process** will be built as an ultimate barrier, coming after design changes, to prevent or mitigate a major crisis that could be initiated by the Y2K.

Three levels of response are planned:

- 3.1. Development of organizational or procedural response, where possible, in the event that risks identified in phase 2 cannot be fully corrected.

(deadline May '99)

- 3.2. To cover residual risks that cannot be identified, in application of the "principle of precaution", development of prudent operations - with organization and procedures - in order to be more resistant to a possible complete grid failure or any Y2K failure.

(deadline May '99)

- 3.3. Finally, to ensure rapid response in the event that any precautions fail, creation of "crisis management teams" at strategic locations during the night of 31 December '99:
  - in NPPs,
  - at NPP Operations corporate level,
  - at the Transmission Grid Management level,
  - at the EDF executive level.

## CONCLUSION

*The Year 2000 challenge is (just) one more challenge in the nuclear industry's quest for excellence !*