Y2K Strategies for Korean Nuclear Industry

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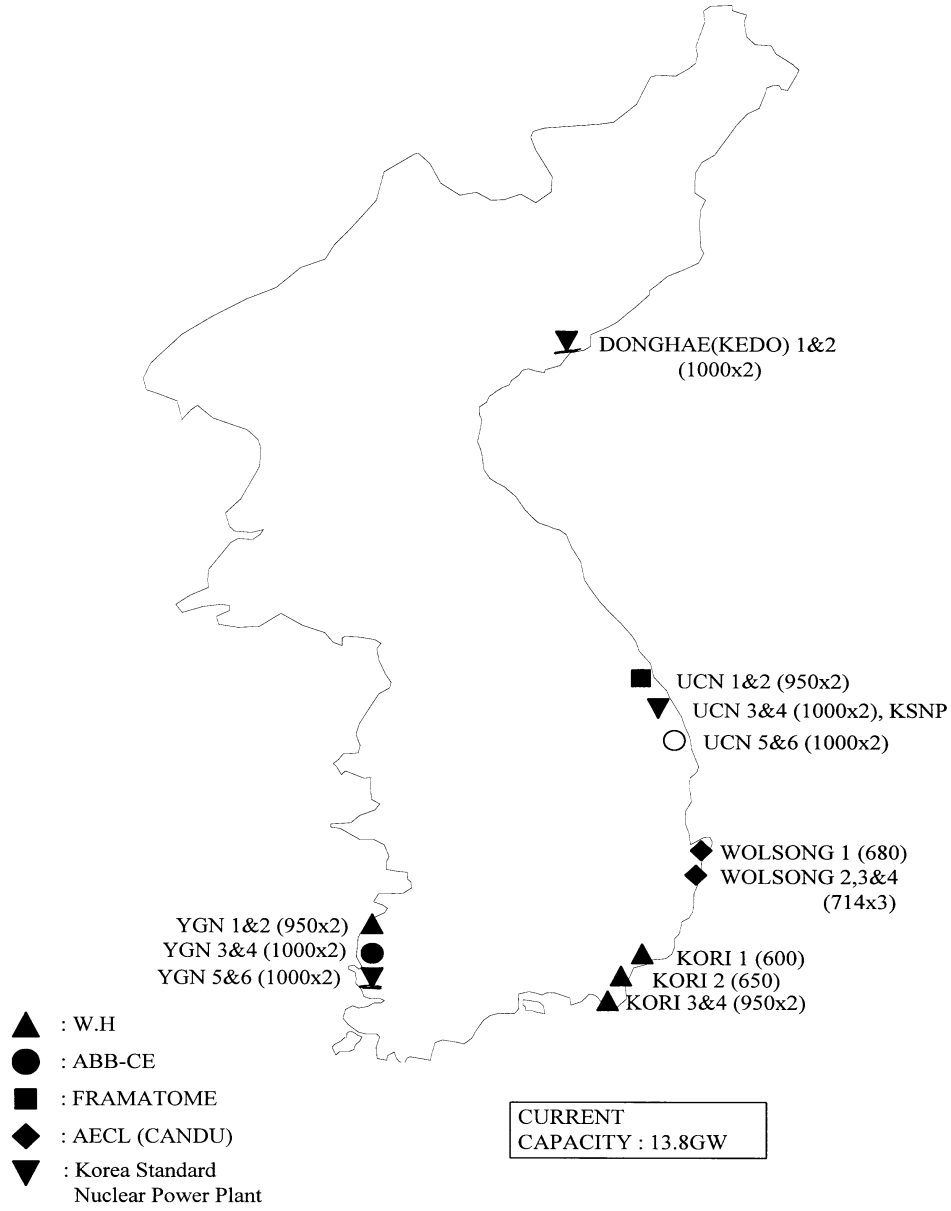
Contents

NPPs in Korea

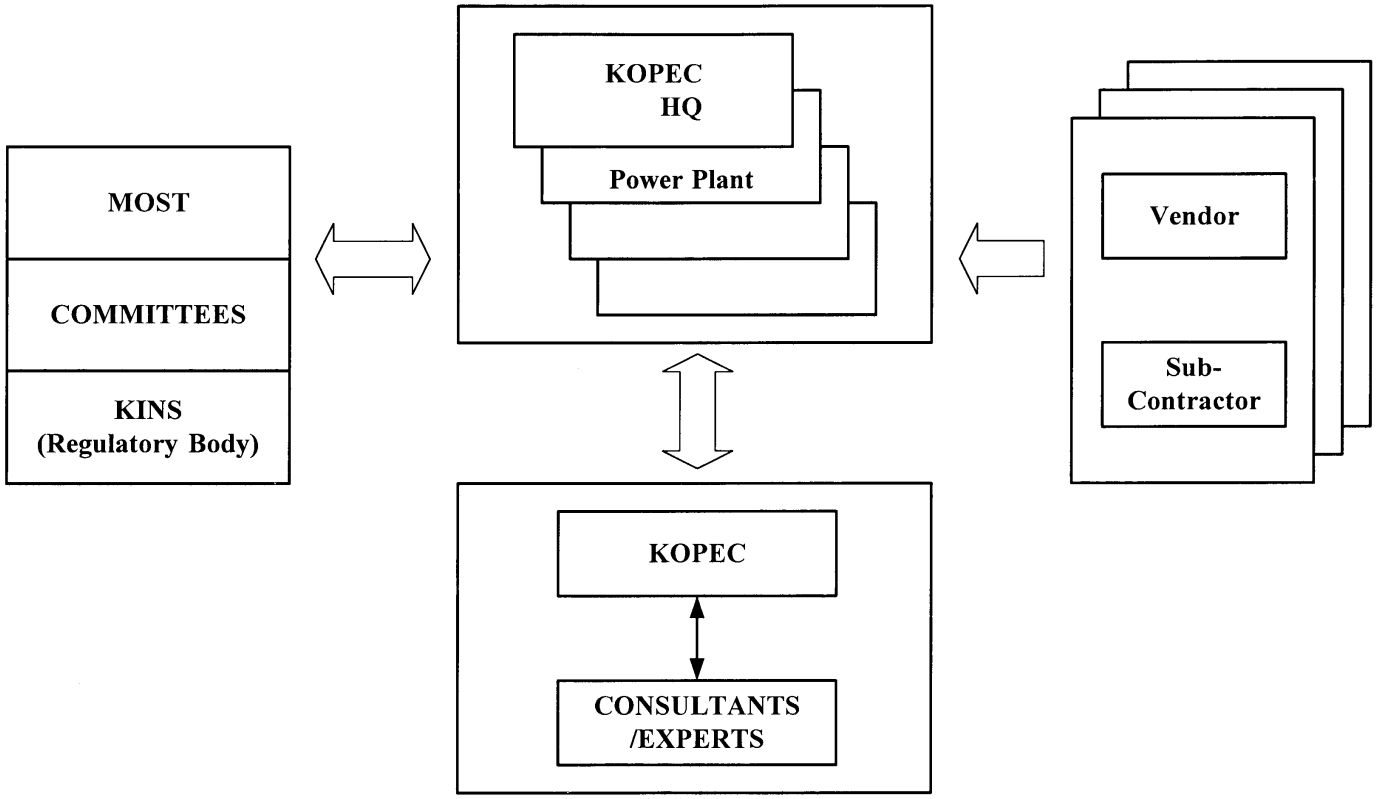
- Diversity of Vendors
  - Westinghouse
  - ABB-Combustion Engineering
  - AECL (Atomic Energy of Canada)
  - Framatome
- Plus Korean Standard Nuclear Power Plants and Korean Next Generation Power Plants
- Diversity of Vendors require more involved efforts by the utility



Nuclear Power Plants in Korea

Governmental Efforts

- **Nuclear Industry:** At the top of the ten most critical areas; incl. banking and finance, telecommunications, etc.
- **Ministry of Science and Technology**
  - Leading Authority
  - Steering Committee Meeting ("The Year 2000 Problems Meeting", April, 1998)
  - MOST, KINS, KEPCO, KOPEC, KNFC,
  - Academic Sectors and Governmental Institutions



Y2K Readiness Structure
for Korean Nuclear Industry

Strategies of KEPCO/KOPEC

- Unified overall plans for all plant sites; Ulchin, YGN, Kori, Wolsong)
- Team of Engineers have been set up for each site; Independent problem solving plus interfaces with other sites when necessary

Findings and Status Quo of the Computer Systems

- LWRs ; High level computers (32bit) are not directly used for protection and control of the plant power
- CANDU ; Power Control using a real time computer. No Y2K impact discovered so far.

Findings and Status Quo of the Computer Systems

- Kori-1
  - Recently went through an overhaul
  - S/G replacement
  - Portions of I&C monitoring systems replaced with Y2K problems resolved.

Stepwise Planning Strategy

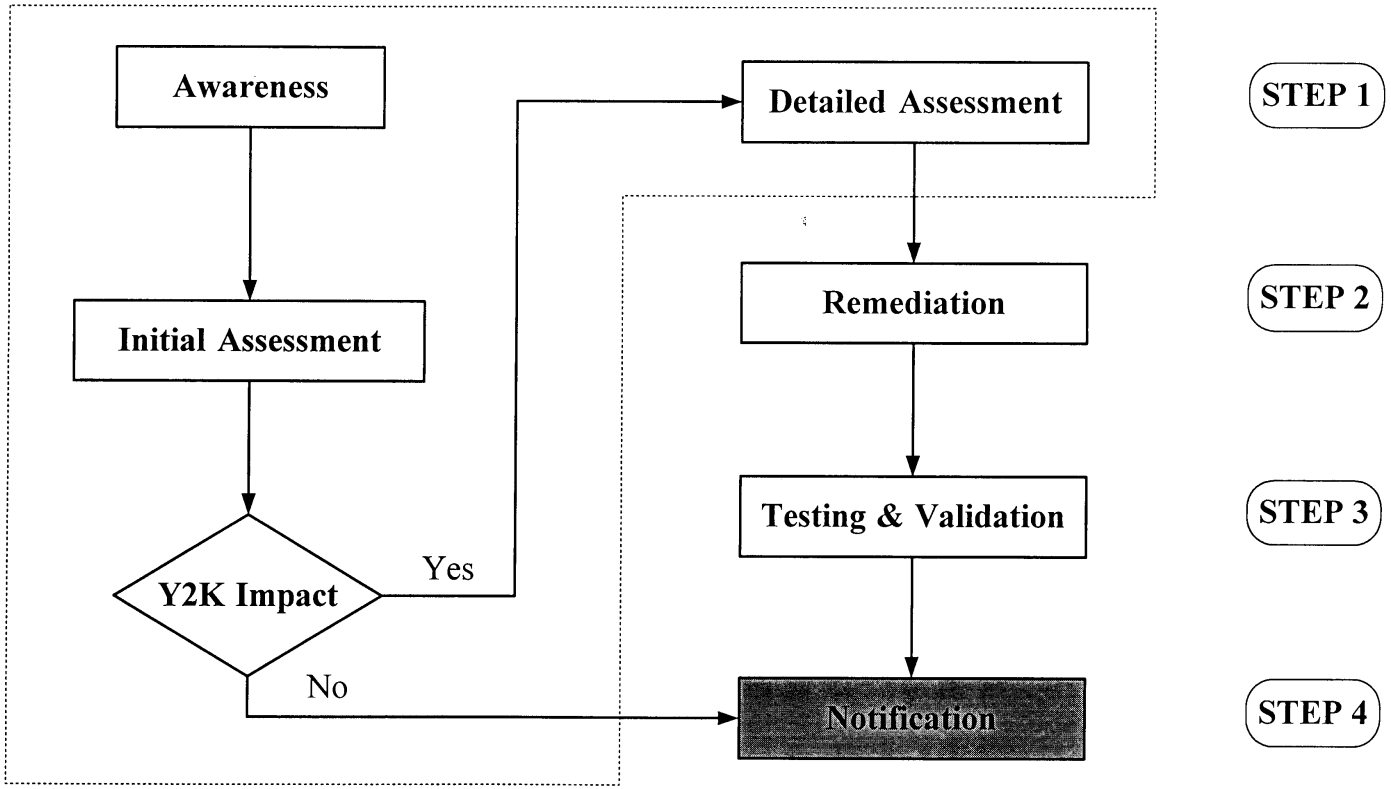
- Develop Unified Plan
  - Operational Electric Power Generating Reactors
  - Research Facility Reactors
  - Nuclear Fuel Cycle Facilities
  - Include formation of a special Y2K task force with overseeing authority
  - Development of general methodology, completion schedule, contingency plans

Stepwise Planning Strategy

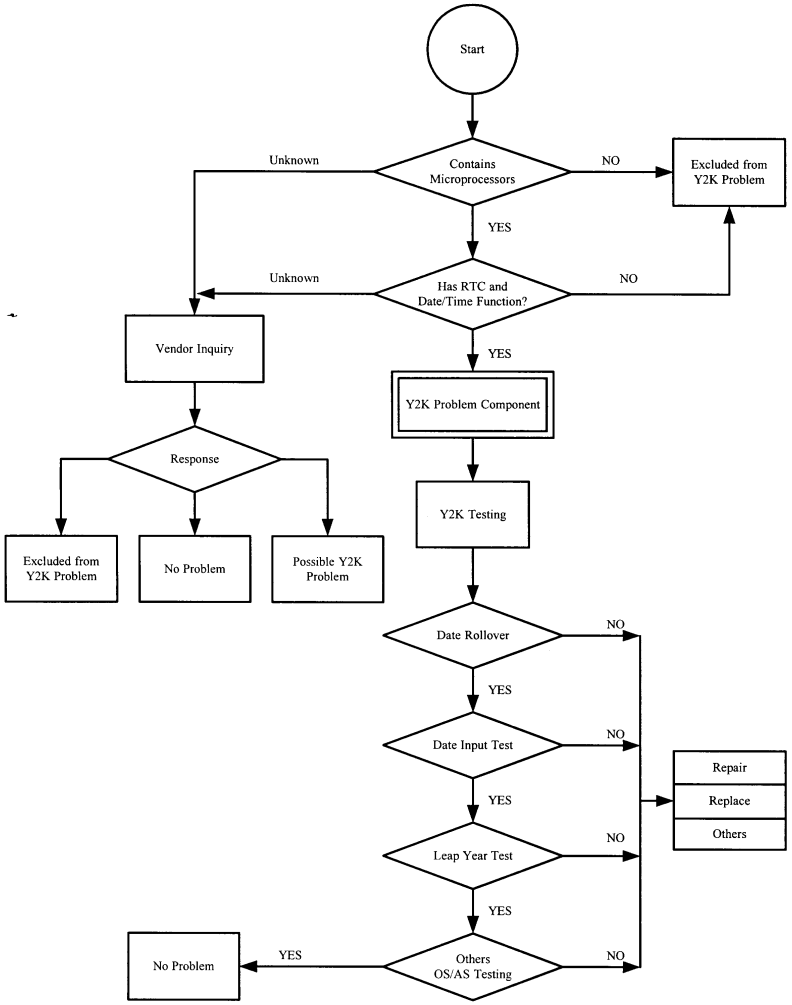
- Identifying Systems which utilize Digital Computers ; Safety, Control, Monitoring Systems are to be identified
- Asses Extent of Problems ; Determine whether analysis and/or testing is required

Stepwise Planning Strategy

- Corrective Action
  - Where Remediation is required
  - External Vendors or Contractors



Stepwise Planning Strategy



Procedure for Y2K Assessment

A Typical Contingency Plan

- **Plant Computer System**
  - Many engineering and general purpose application programs. Real time monitoring of the power plant.
- **Application Program (AP; an alias)**
  - One of the most critical engineering application programs

A Typical Contingency Plan

- **Emergency Response Measures**
  - Run on a Y2K problem free computer
  - Set the year back by 28 years
  - Program failure ; close observation, manual restart, use procedure manual
  - Calculation faults; manual calcs.

A Typical Contingency Plan

- Emergency Response Measures (cont.)
  - Loss of continuity of trend display; Switch from slave to master. Restart the trend program only

Conclusion

- June 30, 1999 (Original Plan)
  - Major remediation activities deadline
  - Continuity of operation and documentation work through the end of 1999.

Conclusion

- Speedup Plan by Presidential Office
  - Issue date : December 10, 1998
  - Remediation : Feb. 1999
  - Verification and Testing : Apr. 1999
  - Implementation : Aug. 1999

Conclusion

- Legal Problems
  - Area of major concern by high level KEPCO managers
- Embedded Chips and RTCs
  - Delayed responses from vendors could mean low reliabilities at times