Y2K Strategies for Korean Nuclear Industry

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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
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
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
- Assess 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

1. Awareness
   - Initial Assessment
     - Y2K Impact
       - Yes
         - Detailed Assessment
           - Remediation
             - Testing & Validation
               - Notification
       - No
         - Notification

2. Detailed Assessment
3. Remediation
4. Testing & Validation
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
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