NUCLEAR POWER PLANT PERFORMANCE; KEPCO'S INITIATIVE FOR IMPROVEMENT

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ABSTRACT

Nuclear power is playing a major role for supplying electricity in Korea. Excellent performance of nuclear plants yields more efficient production of electricity and enhances public confidence in the safety, economic competitiveness, and environmental advantages of nuclear energy.

One basic indicator of the technical and economic performance of a nuclear plant is capacity factor. Greater efforts have been made to improve the availability and safety of nuclear power plants in Korea. As a result, the Korean nuclear power plants have shown remarkable performance improvement. For instance, the average capacity factor in 1996 was 87.5%, sustaining over 80% level for the last six consecutive years.

KEPCO has implemented a comprehensive program for improving plant performance, which can be listed as follows:

- Management by Objectives (MBO) system: This is done by setting management goals for capacity factor, reliability of the safety related systems, eliminating unscheduled outages, shortening of the refueling outage periods, reduction of radioactive waste production, and quality control. These goals serve as the basis for evaluation of plant performance and contributions of plant personnel.
- Systematic feedback of operating experiences: Events, operation and maintenance experiences, good practices, findings or recommendations and results from the evaluation of in-house, regulatory and outside organizations are systematically incorporated into plant procedures, goals, and plans. Also this information is quickly disseminated to the all other nuclear plants.
- Enhancement of nuclear safety culture: This is a basic element for high-level safety and good performance. We incorporated this concept in training courses as a process for learning from experience and for feeding back such lessons into improvement of operations, with no culture of blame. Safety culture is taught in every training class as a compulsory subject. Special training courses for safety managers and personnel of nuclear power plants and assessment system were developed and implemented.
- Quality management: Quality policy, strategy and objectives are established and implemented. Also a training course for this was set up to upgrade quality management. We encourage our people to achieve quality goals by applying the quality objectives in evaluating the performance of our nuclear power stations.
- Utilization of benchmarking techniques: We have introduced benchmarking techniques for making our nuclear plant management a world class level. Benchmarking was applied to the administrative organization performance, plant operation, radiation control, refueling duration, and other areas.

- Securing maintenance quality: KEPCO trains maintenance specialists in each field. The quality of planned preventive maintenance is secured by adopting a system of quality verification for each work process and strengthening quality inspections. We try to eliminate any adverse factors affecting the safe operation of our facilities. Also prior to any important task, a senior manager will review the technical aspects and attend during the work process.
- Improvement and replacement of aged equipment: KEPCO is replacing the Kori Unit 1 steam generators, the low pressure turbine rotors and MSRs of Kori Units 1-4. Other various major aged equipment is also being replaced or upgraded.

KEPCO has adopted an extended 18 months fuel cycle operation for its PWR plants' availability. In order to reduce unplanned shutdowns, KEPCO has set the goal for OCTF (One Cycle Trouble Free) as a corporate motto.

Through our continuous efforts, unplanned shutdowns were reduced to 0.9 occurrences per reactor in 1996.

As plant systems, structures, and components grow older, plant lifetime management becomes increasingly one of the major areas of interest for utilities. This management is one more way we at KEPCO assure safe and reliable operation of our NPPS throughout their lifetime.

As you can see, KEPCO has taken a number of positive steps to improve the performance of its nuclear power plants with good results. A major challenge in the years ahead will be to ensure that improvements are sustained, and that new initiatives are launched for continuing progress in the economic competitiveness, reliability, and safety of nuclear plants.

The following action items will be carried out to sustain the continued improvements of our nuclear performance.

- KEPCO will continue to enhance its safety culture, its program to manage aged nuclear plants, and enforcement of training.
- We expect that within the next 10 to 20 years that many old nuclear plants will require plant life extension, and we believe it is necessary to establish a plan for this prospect.
- We will continuously exchange information and increase technical cooperation with agencies like IAEA, INPO, WANO and other utility companies.