TWO DECADES OF QUALITY CIRCLES: BENEFITS OF INNOVATIVE APPROACH IN THE FIELD OF RADIATION PROTECTION IN INDIAN NUCLEAR POWER PLANTS

Team work plays an important role in any organization to promote the productivity of the persons involved in manufacturing or services. The Japanese had utilized this feature in their organizations and reaped rich dividends in terms of excellent product quality and in service sectors like banking, medical service and education. Several problem-solving techniques which include processing of numerical data as well as language data are in use in Japanese industries. These include techniques like 7 statistical tools, work place management popularly known as Five S, Deming Circle, Poka Yoke, Kanban, Affinity diagram, Relation diagram, Cause and Effect diagram etc. The Quality Circles which comprise of volunteers from the field, brought in innovative approach in every walk of life and strengthened the nation’s economy. Quality Circle concept came to India during 1982 through BHEL, Hyderabad. To day the quality culture had spread to several industries and service sectors in India.

Quality circles were introduced to Nuclear Power plants during 1987. The Health Physics Division had recognized the potential of the Quality Circles and made efforts to promote team work to bring out the potential of the plant personnel and health physics personnel to improve safety in a cost-effective manner in all the nuclear power plants. About 150 Quality Circles are functioning in different nuclear power stations in our country.

These circles had prepared and presented about 450 case studies during the last two decades. Health physics units in different power stations actively participated in spear heading quality approach in power stations through organization of regular training programs on problem solving techniques and also developed several systems and modifications to enhance the efficiency of radiation production groups in the power stations. As of now about 15 Quality Circles are functioning in health physics units and more than 80 case studies were presented by these circles in different fora. The circle activities supported by the plant management resulted in saving of money, manrem and man-hours. Development of innovative radiological information and communication systems and knowledge management were the benefits of these continuous improvement efforts. Some of the important developmental work carried out in the power stations by the health physics teams follows:

Case studies from TAPS 1&2

**Avakash QC:**

01. Enhancement in Thermo-Luminescent Dosimeter Issue Program
02. Quality improvements in maintenance of outside plant areas
03. Application of area radiation monitor in radiography tests
04. Use of 3D animations for pre job briefing, mock ups and on-the-job training
05. Process development of radioactive waste storage tanks.

**Avishkar QC:**

01. Measures adopted in collective dose reduction
02. Tools to reduce lost time in execution of jobs in radioactive areas.
03. Analysis of operating experience and revision of
set points for area radiation monitors.

04. Development of database for health physics instruments

05. Evolution of budget code for effective dose control.

Case studies from TAPS 3&4

Dream QC:

01. Development of Dose Management Software

02. Development of Software for Health Physics Data Management

03. Development of radiation instrument calibration facility

04. Development of Dose info.com

05. Implementation of Five S in health physics unit laboratories.

Cosmos QC:

01. Development of Radiation protection training facility

02. Development of Handy air samplers

03. KAIZEN in gaseous effluent monitoring system

04. Development of model hand and foot contamination monitors

05. Range extension of low range area radiation monitors.

Case studies from MAPS 1&2

Radiation Safety QC:

01. Development of Hydrostatic absorption sampling system for tritium estimation

02. Quick assessment of particulate activity by survey of filter paper

03. Development of health physics sampling stations in reactor building areas

04. Standardization of remote sampling technique for air activity estimation

05. Assessment of particulate air activity by gravity settling technique

06. Development of cartridge syringe system for estimation of fission product noble gases and radio iodine in reactor building environment.

07. Development of PVC bubblers for assessment of tritium in air

08. Resolving the dose differences in dosimetry devices (thermo-luminescent dosimeter and direct reading dosimeter)

09. Improvement in tritium in air assessment technique from remote areas (fuel transfer room, shut down accessible areas)

10. Development of air displacement system for tritium in air assessment in reactor building environment

11. Minimizing the difficulties in issue and collection of direct reading dosimeters

12. Minimizing the difficulties in issue and collection of thermo-luminescent dosimeters

13. Stream lining the issue of thermo-luminescent dosimeters for contractor personnel

14. Quality Assurance in tritium assessment techniques

15. Improvements in public awareness programs for members of public in emergency planning zone

16. Improvement in availability of direct reading dosimeters during reactor outages

17. Up linking of tritium uptake data to shift room for radiological work permit clearance.

Source QC:

01. Development of teledosimetry for monitoring work in shut down accessible areas

02. Development of dosimeter calibration system

03. Development of system for floor contamination monitoring.

Model QC:

01. Introduction of plastic vials for tritium assessment in the laboratory

02. Minimizing the difficulties in clearing radiological
ANNOUNCEMENT

Forthcoming Symposium
Sixteenth National Symposium & Workshop on Thermal Analysis

THERMANS 2008

DAE/BRNS has organized a three-day symposium from Feb. 4-6, 2008, and a two day Workshop from Feb. 7-8, 2008, at the Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamilnadu.

The following topics would be covered:

For details regarding submission of abstracts; Participation in M.D. Karkhanawala Essay Contest 2008; NETZSCH-ITAS Award 2008; TA Instruments - ITAS Young Scientist Award 2008; Dr Gurdip Singh Award for Best Thesis in Thermal Analysis; one can visit the website www.itasindia.org

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Case studies from KAPS 1&2

Health Physics QC:
01. Development of Tritium air sampler (two bubbler system)
02. Tritium air sampling through gravity flow device

Rising Sun QC:
01. Development of software to monitor bioassay sample submission compliance.