

OSART Good Practices

MAINTENANCE

Conduct of Maintenance Work

Belleville, France

Mission Date; 9-26 October, 2000

A simple method of recording all the information related with tracking technical/administrative documentation of In-Service Inspection (ISI) indications is being used at Belleville site and is now required on all EDF plants. It permits a faster treatment and retrieval of dossiers inside EDF and with the French Safety authorities.

The main information includes:

- determining the nature of the defect and its analysis
- presumption of evolution or not
- harm that might be caused: qualitative and quantitative analyses if required
- evaluation of the impact on the safety of the plant or risk for personnel
- possible remedial actions
- choice of the treatment or monitoring action
- performance of requested repair work.

The last ten-year outage at Belleville demonstrated the effectiveness of this indication treatment methodology.

Temelin 1/2, Czech Republic

Mission Date; 12 Feb.-1 Mar., 2001

A process suitable for predetermining the appropriate torque to be applied when tightening the bolts was established when state-of-the-art gasket material is used. This action was necessary because asbestos containing gaskets were replaced in a large number of valves with gaskets of other materials, like expanded graphite and other state-of-the-art materials. By using dedicated, validated and certified software developed by the CVUT Praha, the Czech Technical University of Prague, the process to establish reliable quantification for all application cases was introduced successfully. The Czech Technical University of Prague was consulted, and acted as the Technical Support Organization for this project, and also provided the required training for the plant personnel to demonstrate their competence.

Angra 1, Brazil

Mission Date; 30 June-17 July, 2003

Managers and supervisors monitor important maintenance activities in the field based on expectations to objective established in a formal procedure, PA-ME 10. The objective of the observations is to identify weakness in human performance.

Rovno 1/2, Ukraine

Mission Date; 22 Sept-9 Oct, 2003

The plant has performed maintenance works under a slogan of the motto "Prevent rather than Correct".

It is well understood by all affected personnel. Under this slogan, the plant aggressively traces the in-service inspection records, root cause analysis results, and maintenance histories of equipment using the database KUDO to strengthen the predictive and preventive maintenance programs and the life extension program.

After the plant management sloganeered the motto in 1996, the trends of increasing quality of maintenance and of decreasing troubles of equipments are evident in the records such as number of incidents, unit load factor, availability factor and time factor. The slogan encourages good safety culture and leads the personnel to maintain the plant equipment in such a way that it is safe, reliable and efficient.

Penly, France

Mission Date; 29 Nov.-16 Dec., 2004

The team recognized the contribution by maintenance staff to operating experience as a good practice.

In maintenance, technicians feed the operating experience originated from the field into a Permanent Progress Sheet (FPP) or into suggestion books. This feedback leads the technicians to suggesting improvement solutions.

Examples:

- Suggestion for improving a handling device that is not well adapted,
- Improvement of a tool lacking efficiency,
- Improvement of the clarity of maintenance worksheet or procedure,

These suggestions are submitted for approval to the team leader in charge of performing the technical check on the finding. Once accepted, they are tracked via a computer file with a processing deadline depending on their importance (industrial safety, nuclear safety ...).

The contribution by the staff to operating experience is also made evident by the local events analysis, formalised in event reports called CREL. These are identified either by line management, or by the employees themselves after identifying low-level events.

-A high level of feedback (FPPs or suggestions) reported by the staff, especially since 2003 (110 in 2002, 417 in 2003 and 348 in 2004).

-An ever decreasing number of significant operating events for which maintenance is responsible (7 SOEs in 2002, 3 in 2003, 1 in 2004).

-Numerous local events analysed (CREL) in order to integrate OE in our daily activities and practices (22 CRELs in 2003, 22 in 2004).

-The amount of FPPs and suggestions produced in the framework of OE is stimulated by the managers' commitment to respond with rigor to any feedback coming from the field.

-Employees may consult at any time the progress status of FPPs and suggestions in computer files available via the maintenance department forums.

-The organisation of FPPs and suggestions corrects weaknesses detected as close as possible to the field. Reduction of deviation findings enhances nuclear safety and productivity.

-The quality and amount of FPPs and suggestions gives credit to individual and collective work. It participates in individual recognition (it is a management tool).

-FPP favours communication within the team as well as with other departments.

Borssele, Netherland

Mission Date; 8 Nov.-7 Dec., 2005

Training of mechanical maintenance personnel to obtain authorization to perform safety checks in electrical cabinets to verify disconnection of components enhances personal safety.

At Borssele NPP, mechanical maintenance personnel are trained in behaviour and observation techniques in electrical environments. The purpose of this is to authorize mechanical maintenance personnel to enter electrical compartments in order to check electrical disconnections prior to maintenance. The authorization is based on a training course in a toolbox meeting and personnel who have passed the training course will be authorized and listed.

Yongwang, Korea

Mission Date; 17 Apr. - 4 May, 2007

I&C surveillance tests (ST) have been significantly enhanced for quality of work and reduction of human error by having visual controls in place during the conduct of tests.

I&C technicians performing the ST wear a yellow jacket and post temporary signs at the entrance of the MCR to alert shift crews of the test taking place and to distinguish themselves from other operators. The person in charge of the test informs the deputy managers of OPS and MA of the test plan one day before the test so good preparations can be made. Before the test begins a sign is posted at the entrance of the MCR showing the details of the test and expected time it will take place. Controls are then put in place for entering the MCR to help operators focus on the test in progress. A good pre job briefing (PJB) is held to discuss the test details, cooperation with operations and any operating experiences. The shift supervisor then informs the shift crew of the results of the PJB. As noted above, testers wear yellow jackets to distinguish themselves from other operators and to be visible to all as testers.

Results: ST are very well planned and executed with improved controls for the prevention of human error.

Mihama 3, Japan

Mission Date; 15 Jan.- 5 Feb., 2009

Field supervisors conduct pre-job TBMs (tool box meetings) to give instructions on the day's work and reinforce safety, quality, and other precautions to workers.

A TBM is a field meeting for the workers of each job, called by the field supervisor before the job starts and when needed (lasts approx. 5 - 10 min.).

At a TBM, the field supervisor checks the workers and their physical conditions, as well as the working organization. The field supervisor also cites past non-conformances and accidents in reinforcing the procedures for important operations and key points of the work to all workers.

A part of the TBM is the use of "action tables of work-related hazards / harmful factors and requirements ("Action Tables" hereafter)", summarizing "hazards involved" for each work item, "rules" for each plant requirement, and "workplace accidents in similar work operations reported at KEPCO power stations over the last five years". The tables, compiled under the Occupational Health & Safety Management System, are distributed to all sections and all contractors.

The Action Tables must be kept at each of the workplaces. The constant accessibility of past accident information makes the tables a tool that significantly contributes to the prevention of workplace accidents.

Also, in daily TBM, persons in charge inform workers of hazards/harmful factors and rules listed in the Action Tables to refresh their knowledge. This increases the level of cautiousness among workers concerning the hazards/harmful factors involved in the day's work, thereby preventing workplace accidents. The practice also has the effect of preventing deviation from the days' work procedures and rules including laws.

