

OSART Good Practices

MAINTENANCE

Organization and Functions

North Anna 1/2, USA

Mission Date; 24 Jan-11 Feb, 2000

The Maintenance Self Improvement Process was designed to be used by Maintenance personnel as a method of identifying concerns, ensuring appropriate levels of review and providing timely resolution. The process consists of the Check Tech Program, Maintenance Review Board (MRB), and the Maintenance Work Around Program. Check Techs are voluntary personnel acting in the capacity of a peer inspector within their discipline. A primary function of the Check Tech is to perform field observations of maintenance activities. This individual observes work and industrial safety practices, adherence to technical and administrative procedures, proper tool usage, foreign material exclusion, pre and post job briefs and other aspects of the job as appropriate. Station management and department heads utilize documented observations made by the Check Tech to help focus resources on areas needing the most improvement. Procedural, physical and administrative barriers to performing tasks are documented by the Check Tech for inclusion in the maintenance department electronic log. This also allows review by other departments, adding to their awareness. These observations may also be written down for presentation to the Maintenance Review Board.

The Maintenance Review Board (MRB) provides a focal point to facilitate addressing of maintenance issues and concerns by maintenance personnel. Each item is given a number for tracking purposes and then is presented to the MRB for consideration. The board decides if the item is to be pursued by the board or if it could be handled internally within that department. The board is composed of and chaired by maintenance personnel. Management participates in an advisory capacity only. Issues that cannot be resolved or are felt to be beyond the scope of the MRB are escalated to the Maintenance Work Around list.

Maintenance Work Around items are assigned a number and priority based on the area of significance. Personnel safety deficiencies, procedural technical inadequacies, ALARA concerns, and rework items, which have alternative actions pending, are given highest priority. Enhancements to procedures, processes, and work practices fall into the next category. The status of these items are periodically presented to upper management. This increases attention to the items by the responsible department heads.

Since its inception in January 1997, the Maintenance Self Improvement Process has been instrumental in identifying and tracking to resolution approx. 270 items.

In addition, Quality Maintenance Teams (QMT) have been appointed with the responsibility to perform Quality Assurance checks during work performance. This strengthens ownership for Quality Assurance in the maintenance department.

Dukovany 1/4, Czech Republic

Mission Date; 5-22 November, 2001

The different tasks of the maintenance groups are co-ordinated via the administrators and the planning and maintenance information systems. The maintenance information system provides excellent information on Technical issues, schedules, failure trends, status of jobs ongoing, contractors, costs and other relevant information used in maintenance. In the system information of jobs already performed is recorded in such a way that a cost benefit assessment can be performed. The information system also keeps track of individuals skills to assure that only qualified people are used.

The architecture of the system and the way the information system is used in the Maintenance Division is as a good practice for the industry.

Nogent, France

Mission Date; 20 Jan.-6 Feb., 2003

Implementation of outage working time follow-up and self-check system within the MMCR department (maintenance-mechanics-boilerwork-valves department) designed to prevent any deviation from employment regulations.

During plant unit outage periods, work monitors are provided with a paper chart for logging their activity providing them with a simple means of ascertaining that they comply with employment regulations (daily and weekly working time, rest time). This is stand alone chart that provides a reminder of the rules to be followed and allows the working periods assigned to the work inspector to be formalized by the project manager at management level. System provides: rapid simple to use self-check, traceability provided between the worker and his functional supervisor and than his hierarchical manager, a remainder of employment regulations and system for anticipating the working time margins available for weekend on-call work.

Krsko, Slovenia

Mission Date; 20 Oct. 6 Nov., 2003

The use of the contractors' self-assessment and correction action plans in assuring the continued development of contractors is a good practice. In conjunction with long-term contracts or long term relationships, allow high standards in contractors' performance to be established in particular for a country with a limited market.

The enhancement of the contractor performance quality through technical specification of procurement request is implemented as follows: QA programs, qualification and training of personnel, documentation, procedures, standards, history tracking, special tool and remote control equipment, reports, and self assessment and correction action plans as a tool for development. These obligations are evaluated by maintenance and officially checked by QA department. Moreover common training of involved personnel is used to improve cooperation between utility and contractor.

Tianwan, China

Mission Date; 26 Jan.-12 Feb., 2004

An I&C simulator has been used since design of the plant systems to improve technical knowledge and to train the personnel of I&C branch (CIO).

This simulator is used to enhance the use of the full digital system configuration tool; simulate and correct the code transportation and simulate proposed design modifications. It is also used as I&C personnel training station before practical use. As it is a static logic generating station the signals can be simulated and the feedback can be reviewed to find the best configuration for a design change.

It is composed of a workstation, similar to the ones used in the main control room, that permits verification of the operation of the plant controls, tracking failures, diagnosis and first approach to plant control design changes.

Philippsburg, Germany

Mission Date; 11-28 Oct., 2004

The maintenance department has an extensive and comprehensive Computerized "Maintenance Expertise and Personnel Qualification Control" ensuring that skills and qualifications to perform maintenance activities, keeping equipment reliability and availability are completed.

This program gathers data on all maintenance staff, including name, date of birth, qualifications, skills, experience time, law retire expectation based on date of birth, status of retirement contract, date of retirement, date when the successor should be contracted, the name of the successor, the average age of maintenance staff and years of knowledge in nuclear industry. This system allows a statistical evaluation according to the actual status and future personnel development to keep maintenance expertise.

To fulfil the requirements for keeping expertise and personnel development, a training procedure workflow was developed, considering "Individual Development" and "New Employee", which establish a matrix about job requirements and knowledge level of each technical employee in the maintenance department. This matrix is used to define the necessary training and education for maintenance staff as well as to ensure that maintenance activities are only done by qualified staff.

Maintenance Handbook

Maintenance Department created its own "Maintenance Handbook" and distributed to all maintenance staff both in the plant and from contractors.

This handbook aims to facilitate all people who are engaged in maintenance work to improve safety of their activities, and to give them basic necessary information on maintenance work.

The book consists of several chapters including: Maintenance organization and responsibility, Standards for conduct of maintenance in TQNPC, Maintenance work planning and implementation, and Appendix.

In the beginning of Chapter 2, "Safety First" is clearly mentioned and five (5) safety fundamentals are shown. These five (5) safety fundamentals are : "Nothing is so important than that it can not be done safely"; "Safety is every staff's responsibility"; "Events and accidents are preventable"; "Safe method is good method"; "Safety events must be reported".

A conservative decision-making, self-check method and ownership, Stop-Think-Act-Review (STAR) method are also described in this chapter.

The following chapter shows a basic workflow from the work request initiation to creation of a maintenance work report and some important points on which all maintenance staff should pay attention during his/ her work. Maintenance staff can easily follow them.

An appendix shows all relevant manuals and general procedures and a list of maintenance behavior standards for major work steps that include also incorrect behavior.

All people who is engaged in maintenance department work carry this handbook. By the information provided in the Maintenance Handbook, every staff including short period contractors will easily find what procedures they need to follow, what are the maintenance and outage organization like, what are the TQNPC encouragements and forbidden by its safety culture, to give them a clear requirements and enhance their knowledge acquired by the fresh-up training.

Quinshan3, China

Mission Date; 5-24 May, 2005

Safety Meetings with participation of major contractors

All maintenance groups in the maintenance department and the fuel handling department weekly hold a safety meeting with participation of major contractors to share information on the recent events and to enhance safety of their activities.

Since 2003, all groups in TQNPC weekly hold a safety meeting. In case of maintenance groups in Maintenance Department and Fuel Handling Department, representatives from major contractors also take part in the meeting. Long-term contractors are also required to hold a weekly safety meeting in the same manner. The objectives of the meeting are to share the updated information on recent safety experience among members, to enhance their safety knowledge and to encourage them to safely complete their work.

During the meeting, participants discuss the national safety regulations, the company safety programmes, safety condition of equipment and systems for which they are responsible for and recent events and their recent experience related to safety. These events and experience include events and near misses in the plant and events in other nuclear power plants and in other industries.

Several special safety meetings were also held in the past two years to discuss specific topics such as TQNPC human factor events, Six Safety Experience shown by WANO, the I-beam falling down event and the collection of condition reports in TQNPC.

The meeting is organized by a plant group leader. Creation and preservation of meeting minutes is a mandatory request and they are kept by a group leader. Documents, materials and safety regulations used for the meeting, analysis result of the safety condition of the equipment and system, summary of the safety condition in the week and summary of the recent safety events, potential risks (near misses) and their resolutions should be attached to the minutes of the meetings.

Blayais, France

Mission Date; 2-19 May, 2005

The plant has very effectively implemented the system of supervision of contractors. For 60% of the plant maintenance activities, the site relies on the services of contractor companies. As part of its monitoring policy, the NPP has set up a structure in order to supervise and evaluate its contractors.

For this purpose, the NPP has provided professional enhancement training to dedicated EDF staff members. This professional enhancement training is based on theoretical and practical training with support of supervisory network. This network is an effective means of exchanging information on good supervisory practices. Also supervision programmes and reports, reference standards, field observation techniques for detecting deficiencies, specialist involvement has been exhaustively implemented, in order to provide the opportunity for rapidly incorporating experience feedback. The feedback experiences database has been set up to build on the work performed by this network.

The structure has brought about ongoing improvements in the quality of sub-contracted work, in terms of nuclear safety, industrial safety, radiation protection and technical performance. It forms part of a sustained improvement initiative.

Contractors Management.

Contractor Management is very efficient due to the contract elaboration, conduct of maintenance work and experience feedback.

Contractor companies are qualified by Rosenergoatom utility and are licenced by the Safety Authorities for work on safety related materials. Contractor companies are regularly checked by Rosenergoatom utility.

The plant calls for bids to choose contractors to perform the planned work. This competition is based on a very high-quality requirements specification. This requirements specification takes into account all the areas connected to contractor involvement. 14 divisions take part in development and control of these contracts. This process management is very strict. After this development, the contracts are approved by plant management and Rosenergoatom utility.

Rosenergoatom utility previously defined the type and the shape of all the documents needed to perform maintenance works. This rule is very well applied by the plant and the contractors. As a result, there is a good comprehension and very good adherence to procedures.

For example:

- work management is exactly the same for plant departments and contractors;
- all the work packages (risk assessment, procedures, step by step following procedures, authorization for work..) are uniform;
- maintenance reports, statements, list of defects, control records are also uniform for plant divisions and contractors.

This situation improves the quality of maintenance work reports and contributes to the improvement of strictness and communication during all maintenance processes.

Contractors and plant staff offices are very closely located. Contractors and plant staff have the same equipment. The contractors work process is very well controlled and managed by the plant staff.

The plant staff evaluates the quality of contractors works, this evaluation is transmitted to Rosenergoatom utility.

Contractors management.

Distinction is drawn between contractor oversight and processing of deficiencies. Support is provided in terms of contractor qualification.

- Distinction drawn between contractor oversight and processing of deficiencies:
- The contractor supervisor applies the oversight programme produced during the work planning phase. He performs field observations in various areas (nuclear safety and quality assurance, work practices and work quality, worker skills, industrial safety, environmental protection, contract management, compliance with labour regulations, etc.)
- In the event of a serious deficiency, the contractor supervisor is required to suspend the job and alert management, who will then take measures to rectify the deficiency.
- The contractor relations team and department management process the complaint:
 - meeting with management of the company responsible for the deficiency,
 - contractual penalties if applicable,
 - reminder of EDF requirements pertaining to the incident,
 - statement of what is required to rectify the situation,
 - approval of action plan produced by the contractor,
 - feedback to corporate level (UTO),
 - definition of reinforced supervisory actions to be applied by the contractor supervisor,
 - status of contractor's action plan tracked through periodic exchanges,
 - Chinon safety/quality department or UTO asked to audit work performance.

This system is an effective means of "protecting" the contractor supervisor by helping to maintain the legitimacy of his position.

- Support provided in terms of contractor qualification:
- Chinon NPP contributes actively to the qualification of new contractor companies. Every year, 5 to 10 new contractor companies are qualified by Chinon for working on EDF plants. The contractor relations team also supports contractor companies by providing them with guidance on how to draw up skills assessment documents and helping them to incorporate OE into their reference base, in close cooperation with UTO, the EDF entity in charge of qualification. If the need arises, the plant is able to provide guidance and support when it comes to professional enhancement training of workers (OMEXOM for containment penetration tests, PNS for the cleaning of conventional cooling/conventional sampling heat exchangers).

Plant commitment to industrial safety for maintenance activities is clear and highly visible. Examples of this commitment include:

- Safety Observer:

Following a plant initiative to significantly improve industrial safety performance, ANO management and the general contractor have worked together to introduce and develop the role of Safety Observer. While the responsibility for personal safety remains clearly with the worker, the safety awareness level of the crew has been augmented by the oversight that the Safety Observer brings to the work. The Safety Observer is selected by the working team, from the team, prior to performing the pre-job brief. The Safety Observer's responsibility is to ensure that the team adheres to all safety rules (such as ensuring personal protective equipment (PPE) is worn and a safety minute is performed at the work area). Additionally, the Safety Observer is a visible point of contact for questions when industrial safety concerns arise or actions need to be taken. The safety observer position is well recognized, his authority is fully accepted among his co-workers and fully supported by management.

The safety observer is identified by highly visible lanyard cards which also details the expectations of the position..

Lanyard card 1 states the following:

Side 1= " SAFETY OBSERVER".

Side 2= What would make the Task Safer??

- REINFORCE:

oPPE Requirements

oUse of"The Safety Minute"

oFall Protection Requirements

- Reminder of Plant Conditions

- Watch for Heat Stress Issues

- Maintain Questioning Attitude

Lanyard card 2 states the following:

- Employee Authorization to STOP Work

"As a contractor representative, you have the Authority without fear of reprimand or retaliation, to immediately stop any work activity that presents a danger to you, your co-workers, our clients, partners or the public. It is your responsibility to get involved by questioning and rectifying any situation that is identified as not in compliance with our Environmental Health and Safety policies. You are to report any conditions or activities that involve violation of established Environmental Health & Safety policies. If you don't feel the issue is addressed adequately, you have the responsibility to raise the issue higher."