

HUMAN PERFORMANCE IN AN OPERATIONAL EVENT - HOW TO IMPROVE IT ?

AN INITIATIVE IN A FRENCH NPP

Contributed by M. MESLIN to the Chattanooga Conference

IMPLEMENTATION AT AN EDF NUCLEAR POWER STATION

Like all EDF's other nuclear power stations, Saint-Laurent-des-Eaux has been developing a major work program in the area of Human Factors for several years now. The program has been presented to and discussed with the French nuclear safety authority.

The program is founded on a conviction on the part of the station's management that the progress that is possible and necessary on the level of station operation is essentially related to individual and group work methods and also to the conditions under which work is carried out.

That is why all the actions undertaken at the station in the Human Factors area are based on a clearly-expressed policy.

ELEMENTS OF HUMAN FACTORS POLICY

The quality finally produced by an operator's performance of a technical task (using "operator" in the broad sense: the person performing an action) does not depend on him or her, but on the entire set of technical and organizational constraints which accompany it. For this reason, the station's Human Factors approach is intended to be an essentially comprehensive one, in the basic sense of that term; that is, its aim is to include all available data in its analyses in explaining a situation or an event.

Human Factors activities are focused on improving the overall quality of work, and not on seeking out errors and failings. Thus, prudence skills and job skills are sought out and valorized in the same way as failure recovery and situation optimization actions.

Quality and performance require cooperation among individuals in the same department or in different departments. This implies tolerating differences and developing complementarities, identifying shared goals and getting people to commit themselves to attaining them, and finally recognizing each person's contribution, in his or her area, to success.

Performance must be the result not of technological activity alone, but also of cohesion of the social fabric. Mobilizing people requires that within working teams there be collective deliberations on methods, on difficulties encountered, on organization, etc., agreements and arbitration conducted in complete transparency, and delegation of responsibilities at the appropriate level accompanied by regular reporting.

THE INTERNAL HUMAN FACTORS NETWORK

For the principles described above to be instilled in managers of operational departments and disseminated through all the activities at a site, it is necessary to build a transverse organization led by a member of the site Management and including full-time specialists and part-time correspondents in the departments.

The existence of this network and its transverse nature make *interdepartmental sharing of organizational and management problems* possible.

The presence of the correspondent *must result in the development of discussion areas in the department*, where each job type can express itself, analyze events and day-to-day procedures, etc.

The correspondent also has a role to fulfill towards the management, helping it to *bring itself down to field level* and understand human contributions both on the individual and group levels.

Concretely, the correspondent participates:

- in analysis of events within his department, but also, if called for, in other departments, so as to avoid reticence of personnel involved towards superiors. In this way, he can promote assessment of feedback concerning Human Factors,
- in transmitting problems he or personnel in his department identify,
- in dissemination of safety/quality culture,
- in conducting organizational change, to the extent that he has received the appropriate training,
- in developing solutions or progress paths.

The correspondent regularly brings up Human Factors issues during management team meetings in his department.

STUDIES AND INITIATIVES FOR IMPROVING QUALITY OF OPERATION

General

The activities of the Human Factors organization are negotiated and described each year in a mission contract signed with the director of the site.

Some of these activities are permanent in nature, such as assistance to management, provided essentially by the human resources representative.

Others are on a case-by-case basis, such as the interventions requested by management in support of a specific program or event (organizational change, managerial difficulties, etc.).

Some projects take place in a time frame of several years and are part of the policy orientations described in this memorandum. Two of them are presented below:

Analysis and valorization of human reliability in reactor operation activities

At the initiative of the site's Management, a research and training-action project on valorization of the activity and working methods of reactor operating teams was set up by the Human Factors organization in collaboration with a team of ergonomists. The working methods analysis and the training project have three major orientations:

- Understanding how the various teams players structure their day-to-day work and the skills they bring to bear in specific situations to avoid and/or compensate for sources of error, resulting in quality reactor operation.
- Assess the number of operating tasks and situations which tend to enter into potential failure situations, in order to put the importance of situations not compensated for by team members into perspective. This will be achieved by quantifying a certain number of parameters of human reliability, such as elementary error rates, compensation levels, and performance-influencing Factors.
- Describing the reality of operating situations in a common, shared manner (for players both within and external to shift teams) so as to make objective judgment of violations and their consequences possible.

The project is made up of three phases:

- Identification of characteristic operating situations for the installation and the players involved by the ergonomics team and the site's Human Factors consultant,
- Analysis of the activity of the operating teams in order to determine Factors and contexts to be considered during the third phase,
- Implementation of a training-action program with volunteer from different operating teams and job categories. This phase, the most important, makes the participants into observers and analysts of their own individual and group behaviors. This process of reflection, which can be compared to a self-diagnosis, must lead to effective changes in working methods and technical and/or organizational improvement of work situations.

To deal with the quantitative aspect of human contribution to technical performance, researchers specializing in predictive evaluation of human reliability will join the team. Based on the experience they have acquired during simulator enactment of situations, they decide which activities and parameters are pertinent for observation and evaluation.

What is clearly being sought here is a set of reference points to be used in placing human error in a relative context and valorizing situations involving human compensation and optimization. The resulting figures can also be used to follow up the effectiveness of the improvement actions adopted in the framework of the training-action program.

Perception and appropriation of quality in the departments

Based on various diagnoses having to do with implementation of quality assurance in the departments, the station's Management has decided to develop the skills of personnel at the site in this area.

In order to reflect on the problem before reflecting on solutions, this project began by taking stock of the existing situation and studying the needs of the operating departments.

The study, conducted in collaboration with an ergonomics consultant among 50 hierarchical personnel in operational departments (Maintenance, etc.) was concerned with:

- perceptions of quality assurance in the departments,
- difficulties of implementation,
- current and planned actions for developing skills in this area.

The results of this study confirm, notably, the following points:

- the necessity of giving Quality Assurance new direction by re-situating it in the context of personnel job categories,
- the overriding importance of involving personnels in implementing quality assurance,
- the limited effectiveness of training actions which are not relayed in the day-to-day environment.

These results have lead Management to begin by emphasizing a strategy based on specific, targeted projects of the "training-action" type, constructed around concrete problems using a quality approach (as in the project presented above) and involving specially formed working groups.

That choice is reinforced by the encouraging results achieved using a similar approach in the logistics and maintenance resources department for radioactive waste processing.

This type of action, which requires strong involvement of management and the support of outside experts (training, quality, etc.), allows the different departments to fully exercise their responsibility and control over management of their skills in this area by:

- defining objectives to be achieved by these actions,
- choosing and overseeing the work of contractors and subcontractors,
- integrating these actions into an overall department dynamic for the development of quality assurance skills.

CONCLUSION

All of the actions and initiatives described here have been launched and are continuing according to schedule. In an area like this, where appropriation of issues and concepts is difficult and where personnel commitment is necessary, much time and energy must be invested in the preparation and accompaniment of projects. The first concrete results of the reactor operating program are expected in mid-1998.

But a few encouraging points may be noted today: the Human Factors network is operating and is rapidly extending its influence, and more and more operating personnel wish to become involved in the project. Human Factors are beginning to be a part of the site's culture.