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TOOLS TO IMPROVE ANGRA 1 / 2 GENERAL TRAINING PROGRAM

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Abstract

Since Brazil restarted Angra 2 construction in 1995, as a result of the studies of future energy consumption, the Training Department of Eletronuclear developed the training program for site personnel. This new situation has demanded additional efforts and new routines. In the following paragraphs there is a description of significant aspects in this concern. Most of them are now under discussion in the Training Department and some alternative solutions are being adopted in order to face the new challenges.

1. INTRODUCTION

Brazil has one nuclear power plant in operation (Westinghouse – design 657 MW PWR Angra 1 NPP, in commercial operation since 1985), a second one under commissioning (Siemens/KWU design 1300 MW PWR Angra 2 NPP, scheduled to reach its first criticality in December 1999) and a third one for which about 60% of the components are already stored in the site, but pending construction (Siemens/KWU design 1300 MW PWR Angra 3 NPP). These three plants are located in Angra dos Reis, about 150 km south of Rio de Janeiro .

The construction and operation of these three NPPs are under the responsibility of the electrical utility ELETRONUCLEAR S.A.

ELETRONUCLEAR has three Training Centers at the Angra site, namely Angra 1 Training Center, Angra 2 Training Center and the Maintenance Training Center .

International cooperation and assistance has been extensively used during the first years of operation of Angra 1. Today all training modules are developed and updated by the utility staff. Most of the instructors come from the operation staff .

The training methodology is characterized by modules that follow the international practices. The courses are provided for six categories of personnel : licensed operators (SRO & RO), field operators, health physics, chemistry & radiochemistry, maintenance and general employees .

Since 1985 an extensive scope of courses for operators, managers and other specialists from a total of eleven NPPs and other organizations in Germany, Spain, Argentina and Switzerland are being provided by ELETRONUCLEAR with the utilization of the simulator and the Angra 2 Training Center staff .

The provision of such courses for NPP operators from other countries results in the acquisition, by ELETRONUCLEAR instructors, of considerable experience in the field of training of NPP operation personnel. This experience is useful for the qualification of the Angra 2 operators .

The Maintenance Training Center was inaugurated in July 1996. It presently consists of classrooms, meeting rooms and offices for the staff. A maintenance workshop is currently under construction and will be part of the Maintenance Training Center.

The Training Department is responsible for the activities of the three Training Centers. The budget of the Training Department is about 3 million dollars per year, and the average salary of the instructors is about US\$ 2,000.00 per month .

The National Nuclear Energy Commission – CNEN, which is the Brazilian Regulatory Body, is subordinated to the Strategic Affairs Secretary – SAE of the Brazilian government .

There are two categories of nuclear power plant personnel which are regulated by CNEN : Licensed personnel (Senior Reactor Operators – SRO and Reactor Operators – RO) and Health Physics Supervisors. For these two categories, CNEN sets up standards and regulations, which require approval of training programs and certificate them through independent written and oral examinations. All the training activities related to those personnel are reviewed by CNEN. The licensed operators are required biannual retraining courses and their licenses are renewed every two years, after the programs applied are evaluated and approved by CNEN. Their requalification training programs with the utilization of full-scope simulators, however, are performed every year .

2. IMPROVING THE TRAINING PROGRAM

Angra 2 training program was developed and approved in 1996 as part of the general planning of the enterprise that includes all aspects concerning erection, commissioning and operation.

The available time to get the qualification of operation personnel has led Eletronuclear to select a group composed by recently graduated technicians supported by experienced ones.

The purpose of such decision is to compensate the short time dedicated to qualify Reactor Operators and Senior Reactor Operators, through Brazilian Regulatory Body formal evaluation, taking advantage of the experience already gained by Angra 1 operators.

The main goal is the qualification of both new and experienced groups to perform with the functions related to control room activities to ensure good results during plant operation.

Angra 1 operators selected to play this role have been working in shifts at least for the past fifteen years. All of them have been attending the requalification program with good results.

Since the beginning of the training courses, based on the original design philosophy training, some conflicts have arisen. In our preliminary evaluation we have taken into

consideration the fact that the different backgrounds within the group components added to the particularities of each specific operational philosophy would bring some problems to the training classes.

That situation has led Eletronuclear Training Department to start the development of tools to compensate problems that would arise from that specific situation. During this period it became clear that there were also problems in other training activities .

A permanent assessment of the quality of the training program through a systematic evaluation of lectures, scheduling and training material is being established, taking into consideration the observations of all parts involved in the preparation and execution of the General Training Program.

The second step of that process will be the establishment of a formal system to evaluate the effectiveness of training. Presently, Eletronuclear Training Department is studying the alternatives to perform that task.

Modifications have started through a review of the traditional methods of establishing the particular training programs. Regular observation of training activities has pointed out the need of some changes that could improve the results of the General Training Program.

The starting point to achieve that goal, is the establishment of a better communication between plant organization and the Training Department .

A pedagogical evaluation of lectures and lecturers is scheduled in order to assure that suitable training material and teaching techniques are in use by instructors. Once each fifteen days a skilled teacher with a pedagogic approach will witness lectures following a specific procedure to evaluate the main pedagogical aspects concerning the objectives of each particular subject. Communication, ability to involve trainees in discussions and selection of adequate training material, etc will be observed and discussed. Together with the pedagogical evaluation a technical evaluation, to be performed through a rotating instructors schedule will take place. The observations and comments that will come from these evaluations will be permanently discussed and from the conclusions, procedures will be revised.

One of the most important aspects concerning the upgrading of the training process is the quality of training material. Trainees usually wish text material were shorter and oriented only to qualification test preparation, but the policy of the Training Department is to prepare and qualify Angra 1 / 2 personnel to their jobs in a consistent way, they must be able to perform their tasks without direct supervision following the concepts of Safety Culture. The basis for the elaboration of Angra 2 operators training material is the original Design Philosophy Course from KWU/Siemens. It is very extensive, detailed and during the system description phase of the training course, it demands strong dedication of the trainees. A Pre-Licensing Condensed Course which contains a review of the system descriptions focused in the requirements of the Regulatory Body licensing test has been introduced, in the last part of the training program. Text material and lesson plans are being revised in order to eliminate irrelevant information, oral and written examinations are being redesigned to cover clearly the important topics to be evaluated and self-study is now supported by instructors and questionnaires indicating the important points of each particular system .

Rescheduling is also permanently under consideration, feedback from trainees, instructors, line management and coordinators is being encouraged through formal and informal meetings and reports. Training procedures are being revised to include feedback from

trainees through appropriate channels, cooperative interaction between Training Department and Plant Management is established in order to support and monitor the training programs.

Some audiovisual aids are now being introduced in the lectures to replace old slides. Multimedia computer based training supports maintenance and operation training classes, the level of participation and the number of discussions have been significantly increased by the use of these resources.

Maintenance training is now being developed in such a way that it becomes clear to everybody the importance of maintenance for safety. A national industrial school SENAI is now in charge of maintenance basic training, under the supervision of experienced engineers from the Training Department. Specialized Maintenance Training Programs happen in a regular basis in order to fulfill the requirements of Maintenance Qualification Procedures that were revised last year to establish qualification needs for each job position.

The modifications now being implemented should result in more effective training programs and will also reduce the time and effort associated with the training process. Periodic improvements are part of the strategy to get the General Training Program validated and licensed by Brazilian Regulatory Body. In order to achieve this goal a better understanding of SAT methodology is very important. Eletronuclear has just sent IAEA, through Brazilian Regulatory Body, a formal request of technical support in this concern.