

# Control room and workstation design of a nuclear reactor producer of radioisotopes

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A control room is defined as a functional entity with an associated physical structure, where operators carry out the centralized control, monitoring and administrative responsibilities. The inadequate integration between the control room and operators reduces safety, increases the operation complexity, complicates operator training and increases the likelihood of human errors occurrence [1]. The operator is an individual whose primary duties are related to the conduct of monitoring and control functions, usually at a control workstation, either on their own or in conjunction with other personnel, both within the control room or outside [1]. There are two major aspects of the control room design that should be taken into account in an appropriate design that emphasizes safe aspects. One is the suitability of the structure of the control room to withstand possible major hazards events and another is the layout of control room and the arrangement of panels, controls and displays, to ensure effective ergonomic operation of the plant in normal and emergency situations. The goal of the ergonomics is to achieve the best possible match between products and users, in the context of the task to be performed. The incorporation of the ergonomics in the system design, interfaces and equipment offers a lot of opportunities for improvements with regard to system effectiveness, efficiency, reliability and safety. Participatory ergonomics involves experts and operators actively engaged in control room development and analysis of ergonomics problems. Participatory ergonomics involves experts and end-users in planning, developing and implementing workplace changes [2]. It emphasizes the control room development with a deep understanding of the activities performed by operators, of their current work practices, of their needs and skills.

The goal is to encourage and to support work force participation in the analysis, the redesign and evaluation of their own tasks, workplaces and work practices by applying different methods and techniques. The principal objective of this work is to propose a methodology to develop the control room and the workstation of a nuclear reactor producer of radioisotopes. It includes the use of human factors and ergonomics standards, human factors guidelines and the participation of multidisciplinary team that actively participate in control development design, bringing together different information sources, representations, perspectives and fundamental principles. The methodological framework is related to three phases. The first level concerns the definition of a multidisciplinary team. The second level concerns the assignment of the responsibilities and tasks to the multidisciplinary team. The third level concerns the identification of the design requirements. In the first, second and third level there is a verification process. In the last level, a validation process is performed. The methodological framework was applied to the design of the workstation and the control room of a nuclear reactor producer of radioisotopes (Fig. 1).

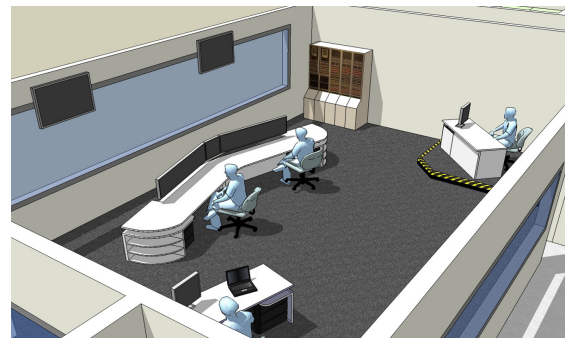


Fig. 1 - Control room and workstation design.

## References

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