OPTIMIZATION OF RADIATION PROTECTION FOR THE CONTROL OF OCCUPATIONAL EXPOSURE

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ABSTRACT

The main emphasis in radiation protection is the "optimization of protection".

The methods for reducing doses covered a broad spectrum, which ranges from simple organizational adjustments to a modification of the design of the facility concerned. The presentation adopts the ALARA techniques means of avoiding exposure to radiation using the three basic protective measures in radiation safety as; time, distance and shielding. Effective work management is necessary for the optimization and reduction of exposures; such as work planning and scheduling; general workers education; awareness; involvement of workers; communication; facility and equipment design; reducing the number of works necessary; reducing dose rates and specialized training.

Other component of the presentation is a general review of the means that are available in most workplaces to reduce exposure. These global means is the application of effective and efficient procedures for the management of work and provision for the education and training of workers.

BACKGROUND / INTRODUCTION

- Principle of optimization is one of the three main principles on which protection against ionizing radiation is based.
- The aim is to develop an effective system of optimization of protection of the workers in achieving doses **As Low As Reasonably Achievable (ALARA)** and provide guidance for licensees and registrants to establish an ALARA workplan.
- The presentation also make provisions to supplement the general principles and guidance on optimization as given by the ICRP1990, in the Basic Safety Standards and Safety Guides with more practical information on how to apply optimization in workplaces.
- The primary responsibility for the optimization of the protection of workers lies with the operator of the facility.
- The primary target audience for the presentation are radiation protection officers, health physicists and NPP facility protection officers who are directly responsible for radiation protection and work mangement. Other target audience are the workers and the regulatory authority personnel. The workers are the ones to be protected and whose commitment are needed for the implementation of the optimization while the regulatory authority clarify compliance of regulatory requirement for optimization for the operators.
- The presentation serves as a model to management for developing or updating programme for effective optimization of RP of the workers.

METHODS / TECHNIQUES

The presentation adopts the ALARA techniques of optimizing exposure to radiation using the three basic protective measures in radiation safety – time, distance and shielding. It also discussed **global means of reducing exposure (**such as work planning & scheduling; general workers education; awareness) and **Job Specific Means of Reducing Exposures** such as Facility and equipment design, reducing work and dose rates and specialized training)

Global Means of Reducing Exposures.

- **Work planning and scheduling:** Effective work management is necessary for the optimization and reduction of exposures.
- **General workers education:** A knowledgeable workforce is a fundamental element in any programme for the optimization of protection and control of exposure.
- **Awareness and involvement of workers:**Awareness on the part of workers has an important role to play in reducing doses.
- **Communication:** Communication is an essential part of any effort to reduce exposures.

Job Specific Means of Reducing Exposures

- **Facility and equipment design:** designing a facility such that it takes full account of the requirement to optimize protection. This is considered the most effective global means of reducing exposure
- **Reducing the time spent in radiation areas:** Reducing the amount of time spent in a radiation area without the quality of the desired output being compromised.
- **Reducing the number of works necessary:** optimizing the number of personnel involved in a job by eliminating unnecessary personnel – using minimum number of personnel necessary to complete the task.
- **Reducing dose rates:** Uses different methods and it depends upon the application and the environment within the facility concerned.
- **Specialized training:** Can be conducted as a second phase of basic training that provides greater detail and hence allow greater responsibilities for workers .

OUTCOME

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- The presentation is in tandem with the principle of radiation protection whose aim is to limit the risk to health arising from exposure to ionizing radiation in the workplace and to optimize this protection by setting common essential requirements for the control of exposure to radiation, including the specification of employer's and employee's duties.

CONCLUSION

- There are situations in which the optimization of protection with respect to particular jobs is needed. In many of these cases, measures to reduce doses can be taken with little cost or even with savings through increased efficiency. In other cases, the allocation of resources would be disproportionate to the dose reductions. Some form of decision aiding technique (e.g cost-benefit analysis) can be helpful.
- The effectiveness of an ALARA plan depends on commitment on the part of management and workforce, which is fostered by the participation of both groups in the ALARA plan's formulation.
- Monitoring the effectiveness of an ALARA plan provides the necessary feedback for sustaining appropriate attitudes to ALARA throughout an organization in the longer term.
- The application of ALARA plan will be at a different level of detail depending on the size of the facility; but in all cases the general approach set out can be adopted and applied for the benefit of radiation workers, managers and their organizations.

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