

# **RADIATION PROTECTION IN TVO AFTER YEAR 2000**

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## **INTRODUCTION**

What is the optimum level of radiation protection in nuclear power plants? Is it still adequate if radiation protection is realized according to ALARA? In most cases I would say no if we are seriously thinking about the acceptability and the future of nuclear power.

Although TVO's annual radiation doses are very low worldwide, on average 0,74 Sv per unit, they are still too high and must be decreased. There are two ways to do it, either by minimizing the radiation sources or by making people work in such a way that they get less doses. In TVO we are doing both. There is a DOSE-project, the aim of which is to decrease the cobalt-60 content in the reactor water by all available means. This paper only discusses how we must take the human factor into consideration in minimizing personal doses in the future.

## **INDIVIDUAL RESPONSIBILITY**

Given the chance, a worker will look for the most dose-efficient method of doing his work. I am convinced that personnel safety will certainly not be at risk if we allocate responsibility more to the individual.

Who is more interested in the person's own radiation doses than the person himself? Nobody! A radiation protection organisation is more interested in seeing that personal dose limits are not exceeded or that collective doses are on acceptable level, but an organisation does not have the capacity, and maybe not even an interest, to concentrate on a single person's low doses. That being the case, the person himself is his best radiation protection man, and the only one to take the whole responsibility for his own safety. Let us make it possible for all nuclear power workers to take care of their own radiation protection. This will take a lot of radiation protection training.

## **TRAINING**

A refuelling outage involves about 1000 workers from some 100 different contractor companies. These workers receive about 70 - 80 % of the total annual dose. If the number of companies were reduced to 20 - 30, arranging company-specific radiation protection training would be more practical. With company-specific training we can concentrate on radiation protection matters that are important to that specific company. Electricians have different problems than mechanics.

Training alone is not enough to keep the contractor companies' knowledge of radiation protection on a high level. Each company should nominate a person who is responsible for the communication between the power company and the contractor company on radiation protection questions. He would be responsible for disseminating all information which is sent to the company to all its employees. He would thus act as a company's own radiation protection manager.

## **VERSATILITY OF SKILLS**

One way of reducing doses is to reduce the number of people working in a controlled area. By teaching people to do a series of operations rather than just one specialist task, the number of people can be reduced. For example, a mechanic can insulate components, make simple scaffoldings and take care of the cleanliness of the work site in addition to his mechanical work. Doing the work in this way, it will become more flexible and also more interesting and more challenging to the employee. A motivated employee also takes good care of his own radiation protection.

## **GENERAL CLEANLINESS AND ORDER**

Cleanliness and order go hand in hand with good radiation protection. That is why the responsibility for the cleanliness of the working environment should also be passed more towards the individual. Contamination cannot be seen by eyes but by keeping surfaces clean and the work site in order, so that there are no unnecessary objects lying around, you can be quite sure that there is no contamination. A high level of cleanliness and order also makes the work site pleasant and safe. Working in such environment is faster and more fluent.

## **DEVELOPMENT OF RADIATION INSTRUMENTS**

As responsibility for radiation protection is given to those who do the work, new demands will be placed on the measuring instruments. They have to be light and simple to use. One push button (on/off) is enough. All other buttons are unnecessary and make using the instrument too difficult. The accuracy of the instrument does not need to be very good; 1 mSv/h is enough. Analogical display is better than digital. The rough range of dose rate is more important than the exact value in numbers. Besides the dose rate instrument, the employee has to have an electronic dosimeter with a digital display and sound alarm to be able to monitor his doses.

## **ONLY BY MEASURING CAN YOU FIND OUT WHICH DOSES YOU SHOULD CONCENTRATE ON REDUCING**