

Optimization of Radiation Protection by Optimizing Technology of CASTOR[®]-Cask Loading

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Abstract

Optimization of Protection is one of the basic principles of the ICRP System of Radiation Protection. Often this principle is misunderstood and people try to achieve minimal doses irrespective of the amount of manpower or money they have to afford to reach this aim. The better way of optimization is to optimize the technology or the practise which is the cause of radiation exposure and at the same time reduce the dose uptake. Three measures have been used for this purpose in the management of spent fuel in Germany in preparation for the dry storage in CASTOR[®]-Casks.

The casks have to be loaded with the spent fuel in the pond of the power plant. After the loading the cask has to be dewatered and dried. The remaining humidity has to be checked with respect to a given maximum residual humidity to avoid corrosion during the long-term storage. Initially a measuring device using the dew point mirror method was used. The mirror was often polluted and needed recalibration. This led to a large variety of measuring times, the time period needed for the above mentioned three steps ranged from 55 to 120 hours. Thus the work could not be reliably planned. To solve this problem we now use a pressure-rise method to measure the humidity within the cask. The time needed is now nearly equal and reliable for all cask loadings and considerably lower than using the dew point method. Thereby the dose uptake of the cask handling staff could be reduced to 2.5 man mSv on average in comparison to the former collective dose of 4 to 5 man mSv.

A second step for reducing the dose of the staff is the introduction of remotely controlled valves for the drying process, the humidity measurement and the subsequent filling with Helium. The valves are located at the lid of the cask where a remarkable dose rate could be. The equipment for the remote valve handling has been successfully tested.

In the same line is a third measure: to record the process data by computer. The supervising personnel will be outside the radiation area than.

All these measures can provide for a dose reduction and at the same time enhance the stability and reliability of the process of preparation of casks for dry storage. As in Germany this is the only way of spent fuel management the effect will be manifold. Currently between 40 and 50 casks have to be loaded per year.

KEYWORDS: *Optimization; Spent Fuel Management; ALARA Practise*

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