

Comments concerning how discrepancies between dosimeter systems used in parallel are dealt with at Ringhals in 2009

Since early 2008 the active dosimetry system was changed from RAD 100 from Alnor, Finland to DMC 2000 S from MGP, France.

Since a few years the “Criteria for further research of difference in dosimeter readings” are as follows (integrated over a period of one month):

1. Estimated dose $\geq 0,5$ mSv
2. Difference in reading $> 0,5$ mSv
3. Electronic dosimeter dose $< 0,7 \times$ TLD dose or
Electronic dosimeter dose $> 1,4 \times$ TLD dose

The Swedish Radiation Protection Institute (changed to Swedish Radiation Safety Authority in 2008) has in 1998 issued a regulation stating requirements for approval of dosimetry services. As a result of this the authority has blind tested and checked the quality management system including the dosimetry department’s procedures at Ringhals and following an application they have approved Ringhals dosimetry service several times and a new approval procedure was performed in 2008-2009.

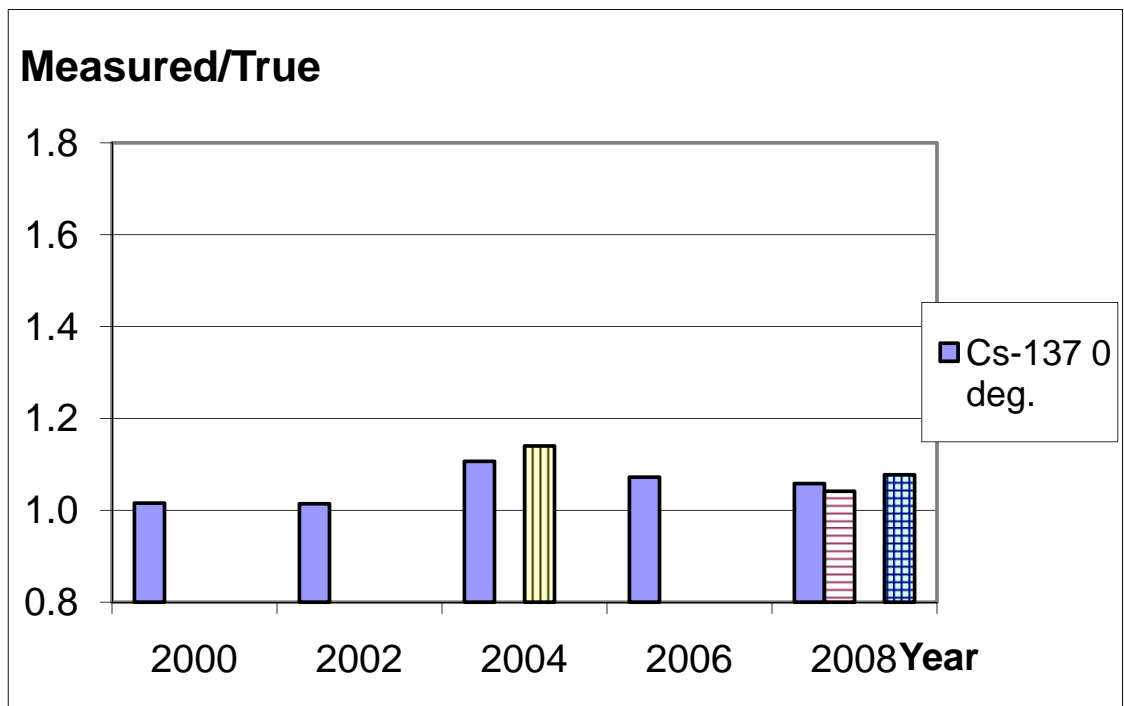


Figure 2. Results of blind tests of the TLD system at Ringhals 2000 – 2008. Ratio between the dose equivalent values reported by Ringhals and the true dose equivalent value.

The figure above shows the results for the five blind tests performed under the regulation from 1998. The ratios are shown as average of all dosimeters for each calibration source and angle. The uncertainty in the “true dose” is 5 % (95 % confidence level). All individual results were inside the “trumpet curve” in ISO 14146. The largest deviations were in the range – 5 % to + 20 %.

A renewal of the approved dosimetry service at Ringhals was decided by the authority in March 2011 based on a blind test that was performed in 2010. In that blind test the measured dose was 104 % of the true value.

References

SSI FS 1998:5 Unofficial translation, The Swedish Radiation Protection Authority's Regulations on Monitoring and Reporting of Individual Radiation Doses.
See <http://www.stralsakerhetsmyndigheten.se/In-English/Regulations/>

Examples of how discrepancies between dosimeter systems used in parallel are dealt with at other nuclear installations

1. Oak Ridge National Laboratory

At ORNL, Knoxville, USA they have made similar tests. This was reported already in 1993. These tests showed for 123 persons during two quarters of a year that all dosimeter readings above 1 mSv were within $\pm 50\%$ while 8 persons had differences outside $\pm 25\%$ for dosimeter readings between 0,5 mSv and 1 mSv.

2. Areva, Marcoule, France

At Areva's site at Marcoule, France they have put up criteria for when a difference between dosimeters need to be investigated.

1. *Estimated dose $\geq 0,5$ mSv*
2. *Active dosimeter dose $< 0,5 \times$ passive dosimeter dose or
Active dosimeter dose $> 2 \times$ passive dosimeter dose*

or

1. *Estimated dose $< 0,5$ mSv*
2. *Active dosimeter reads 0,25 mSv more than the passive dosimeter*

With additional criteria for a twelve month duration.