

## Proposals for KCRV updates for the SIR (BIPM.RI(II)-K1) comparisons

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### 1. KCRV updates published since the 2011 CCRI(II) meeting

The Key Comparison Reference Value (KCRV) updates for  $^{124}\text{Sb}$ ,  $^{139}\text{Ce}$  were published following the 2009 CCRI(II) recommendations (CCRI(II)/09-20). The KCRV updates for  $^{57}\text{Co}$ ,  $^{222}\text{Rn}$  were published following the 2011 CCRI(II) recommendations (CCRI(II)/11-14). The KCRV update for  $^{65}\text{Zn}$  has been postponed following a decision of CCRI(II) who requested a study of possible new rules to define KCRVs and exclude outliers.

For  $^{137}\text{Cs}$ , contrary to the recommendation of the CCRI(II) in 2011, the IFIN-HH 2009 result has not been included in the updated KCRV because this result is based on an IC measurement. The published updated KCRV, including the 2010 NMISA result is thus 27.544 (49) MBq<sup>1</sup>, instead of the value of 27.548 (46) MBq recommended in 2011.

Some delay occurred in the publication of the SIR final reports for organizational reasons at the BIPM and it is expected that the delay would be recovered in the next two years.

### 2. Proposals for KCRV updates

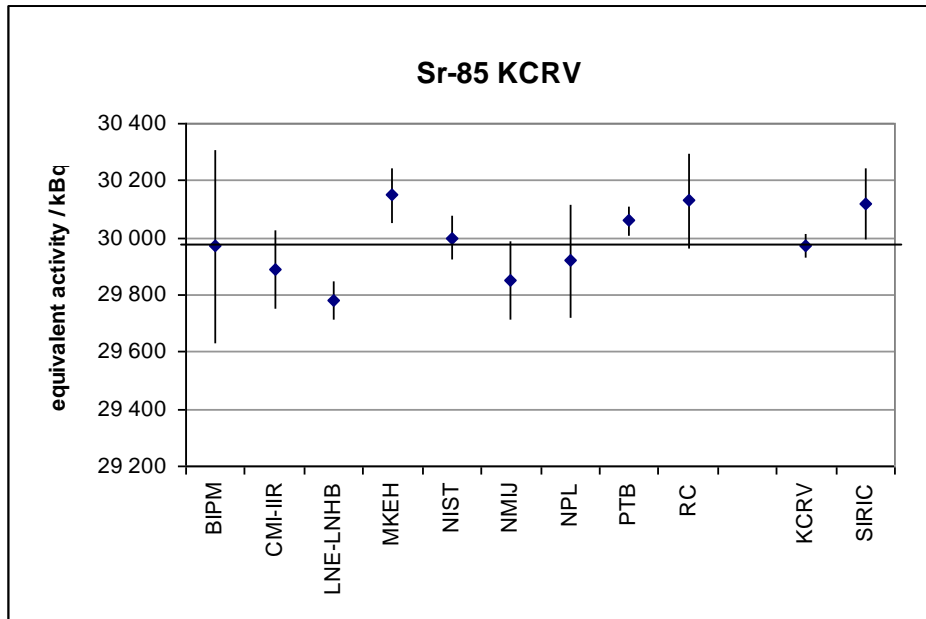
The following proposals for KCRV updates comply with the usual KCWG rules based on an arithmetic mean and the NE ( $k = 4$ ) test to identify outliers that should not be included in the KCRV.

#### $^{85}\text{Sr}$

The RC-POLATOM 2009 result (by  $4\pi(\text{LS})-\gamma$  coinc. and anti-coinc. methods) is eligible to be included in the KCRV for  $^{85}\text{Sr}$  giving an updated value of 29 972 (42) kBq instead of 29 953 (42) kBq as published in 2004. These values can be compared with the value of 30 150 (130) kBq obtained using the SIRIC [1] efficiency curves of the SIR, where the uncertainty is dominated by the component related to the 514 keV gamma-ray emission intensity.

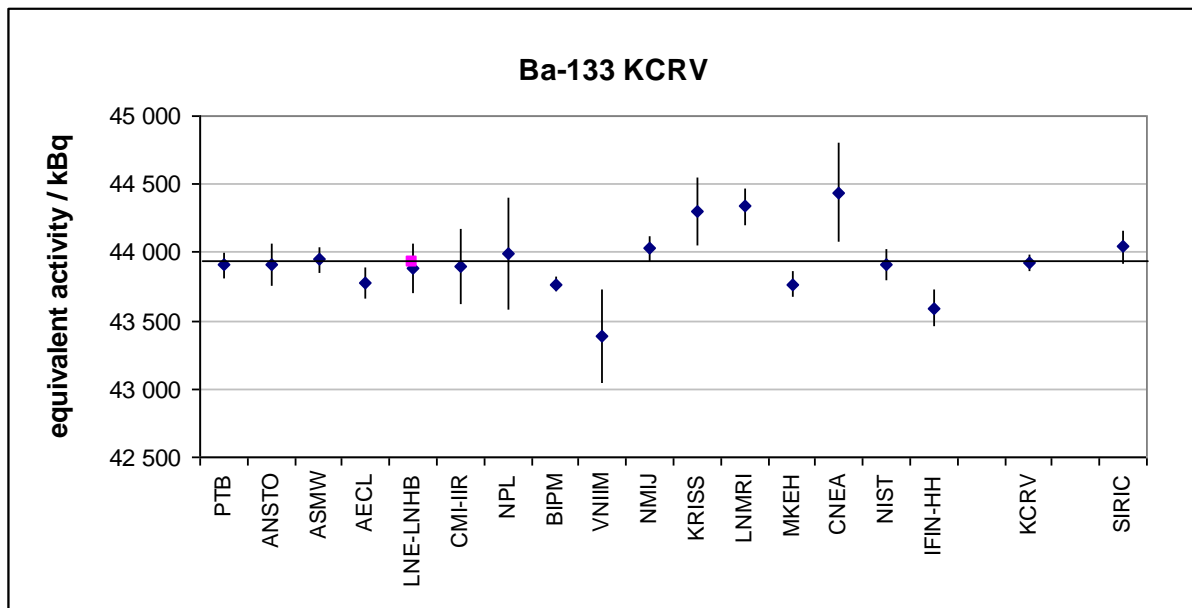
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<sup>1</sup> In the following, the uncertainty shown in parenthesis is given for  $k = 1$ .



<sup>133</sup>Ba

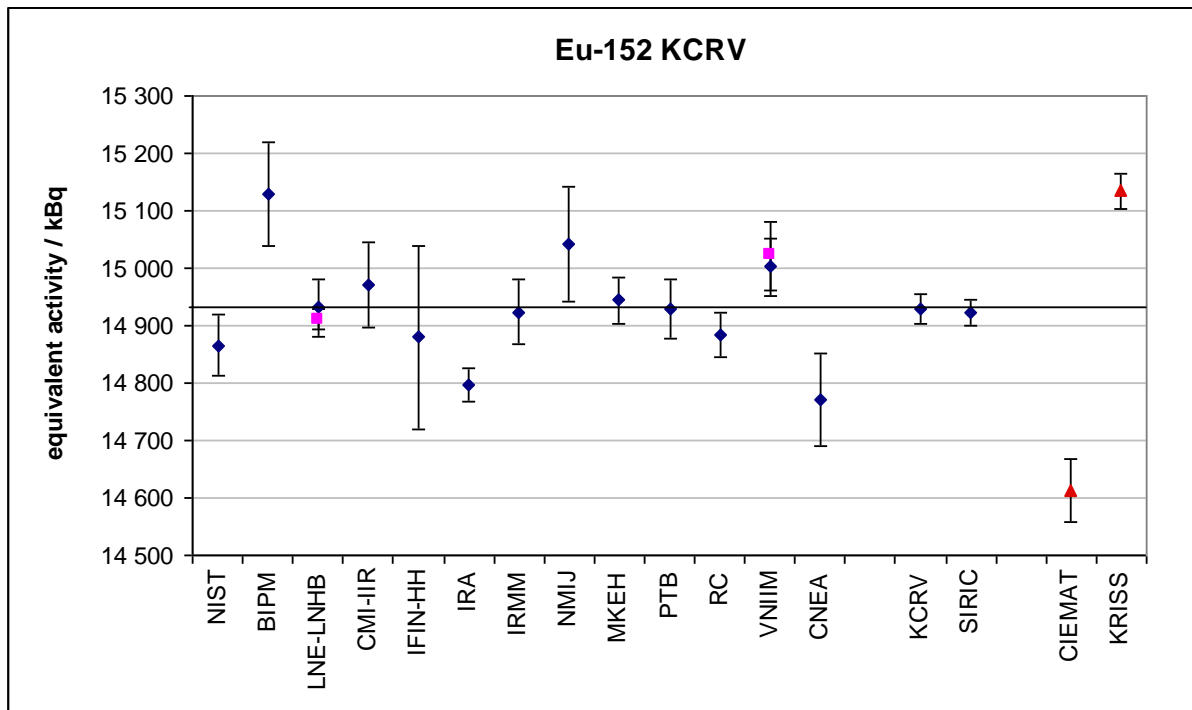
The LNE-LNHB 2012 result (by  $4\pi\gamma$  counting) is eligible to be included in the KCRV for <sup>133</sup>Ba giving an updated value of 43 929 (67) kBq instead of 43 932 (67) kBq as published in 2007 and 43 965 (68) kBq as published in 2003. These values can be compared with the value of 44 040 (130) kBq obtained using the SIRIC [1] efficiency curves of the SIR. For this radionuclide, the 1991 PTKMR result remains an outlier to be excluded from the KCRV following the KCWG rules.



In pink, the original, now superseded 1979 result from LNE-LNHB

$^{152}\text{Eu}$ 

At its last meeting in June 2011, the CCRI(II) already agreed to include the VNIIM 2009 and LNE-LNHB 2009 results in the KCRV for  $^{152}\text{Eu}$ . However, a result from CNEA (2011) (by  $4\pi(\text{PC})\beta\text{-}\gamma$  digital coinc. method) is now also eligible to be included in the KCRV which then becomes 14 929 (27) kBq. This updated KCRV can be compared with the 2004 published value of 14 942 (26) kBq and with the value of 14 923 (23) kBq obtained using the SIRIC [1] efficiency curves of the SIR. For this radionuclide, the 1999 CIEMAT and KRISS results remain outliers to be excluded from the KCRV following the KCWG rules.



In pink, the original, now superseded, results from LNE-LNHB and VNIIM; in red the outliers.

[1] Cox M.G., Michotte C., Pearce A.K., Measurement modelling of the International Reference System (SIR) for gamma-emitting radionuclides, *Monographie BIPM-7*, 2007, 48 pp.