

A Comparison of True and Apparent Activities on Air Filters

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Background

- Many measurements of small air filters and surface wipes
- Standard sources are unrepresentative of filters
- Anecdotal evidence - true activity could be 3 x monitor results!

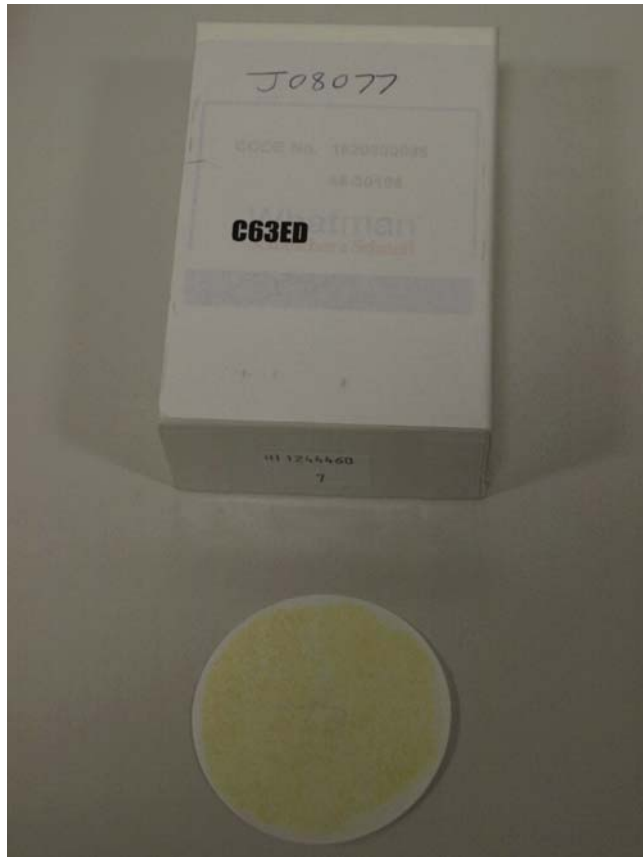
- NPL included project in 2007-10 programme to investigate
- Restricted to **alpha-emitters on air filters**

Plan

1. Procure 'real' contaminated filters (~ 20) from nuclear sites
 2. Borrow typical monitors and measure filters
 3. Dissolve filters individually, separate out alphas and count
 4. Send details of measurements to donor labs
 5. Present results at ARMUG
 6. Produce report
- 19 filters procured from 3 UK sites (3+6+10)

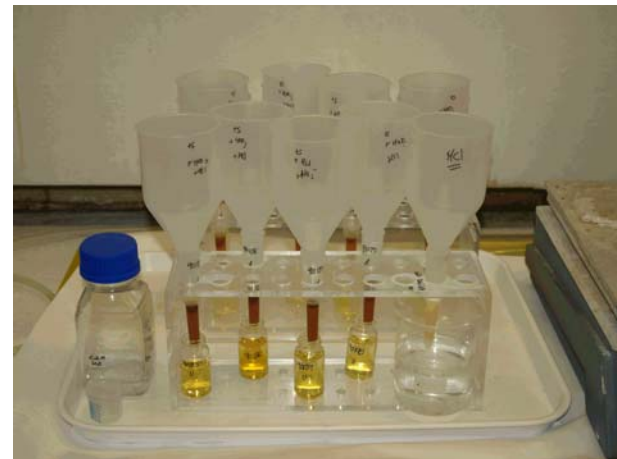
Monitors used

- **Canberra 'iSolo'**
 - α and β channels
- **JCS unit and Harwell 'drawer' counters**
 - α and β
- **Mini 900EP15**
- **AP2**

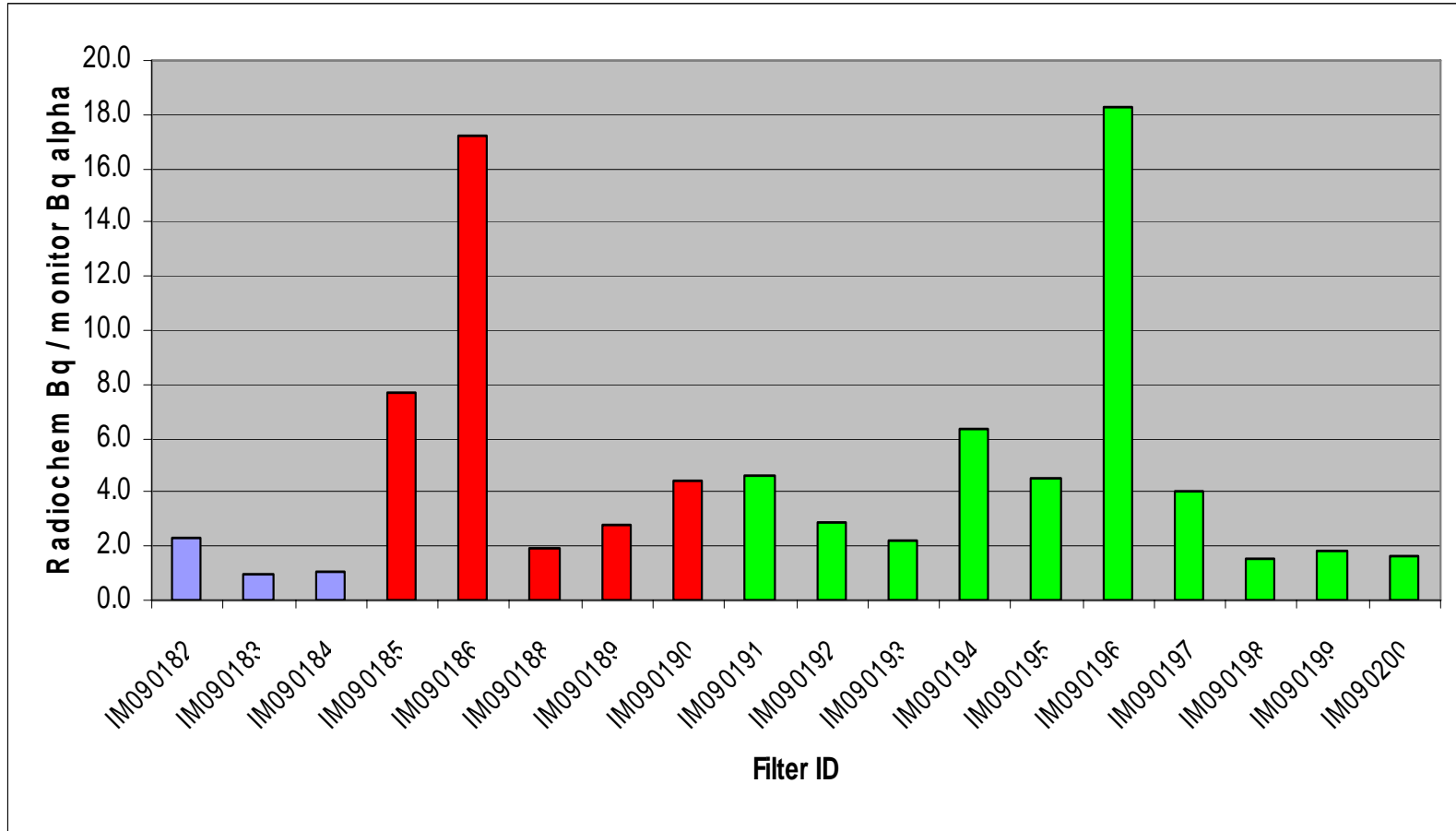


Radiochemical analyses

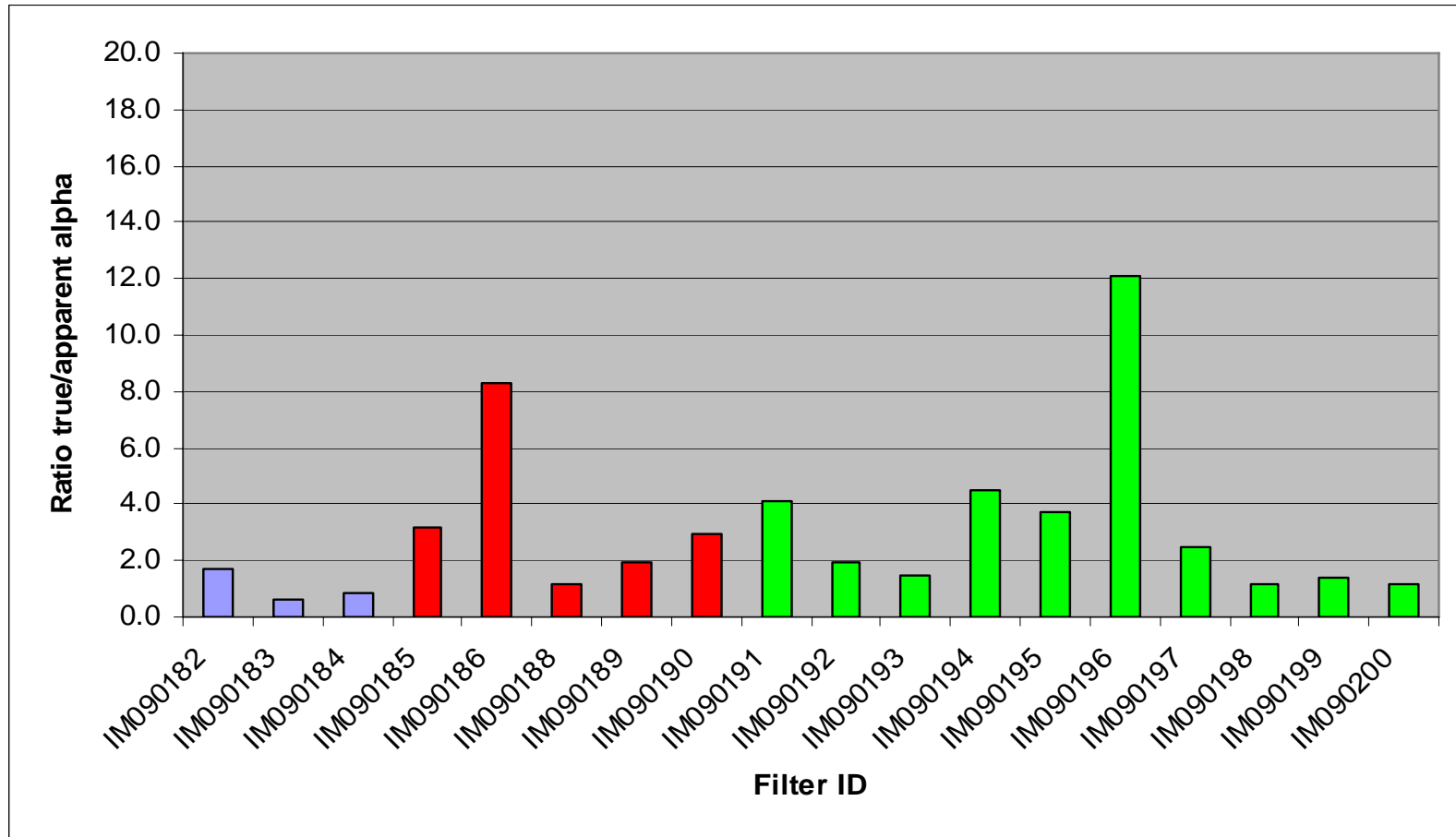
1. Filters dissolved (HF, nitric acid and microwave)
2. Samples of some filter solutions set aside for γ -spectrometry
3. Pu , U and Am nuclides separated out using resin columns
4. Plated for α -spectrometry (3 sources per filter).



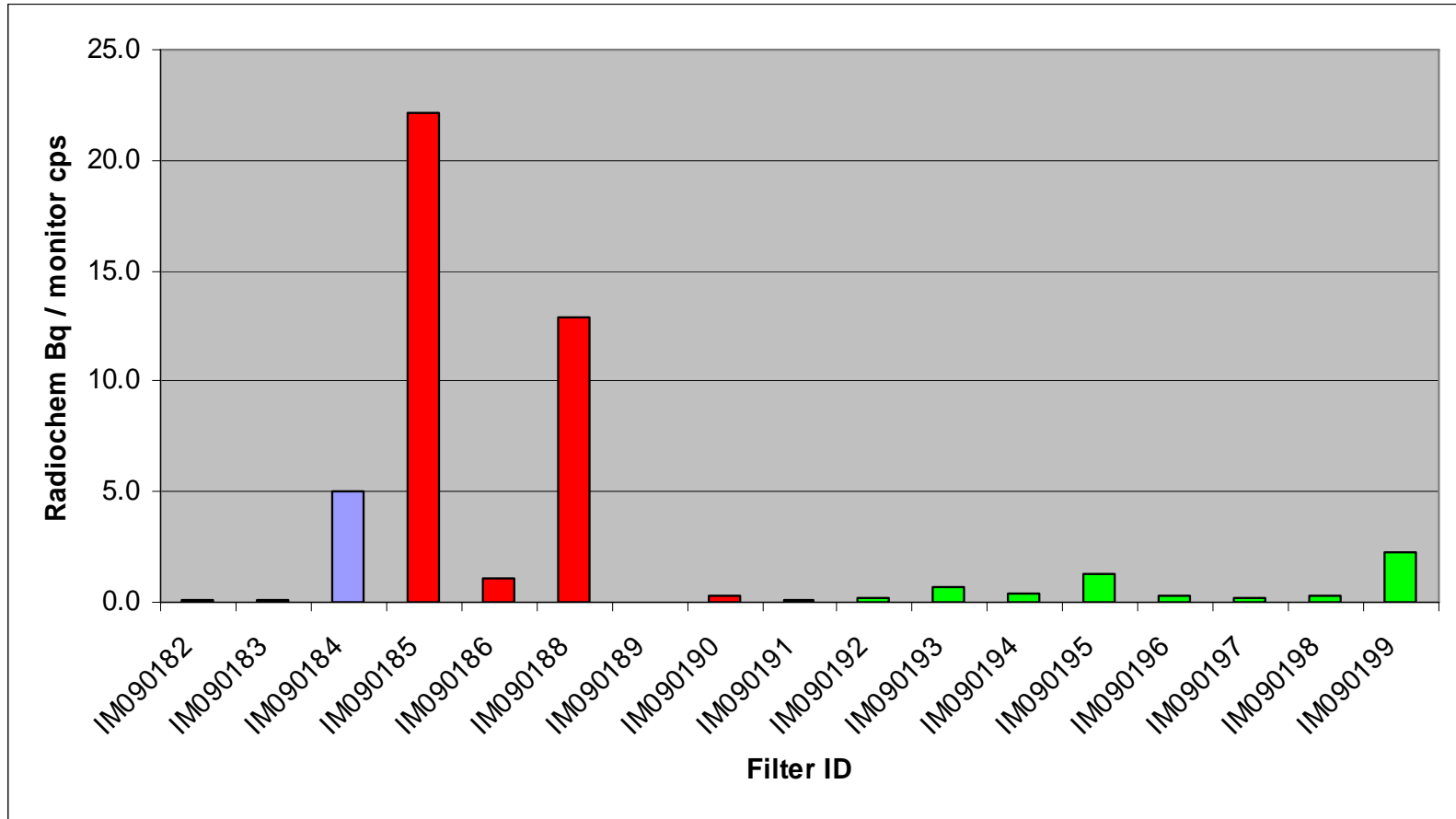
Provisional results for iSolo



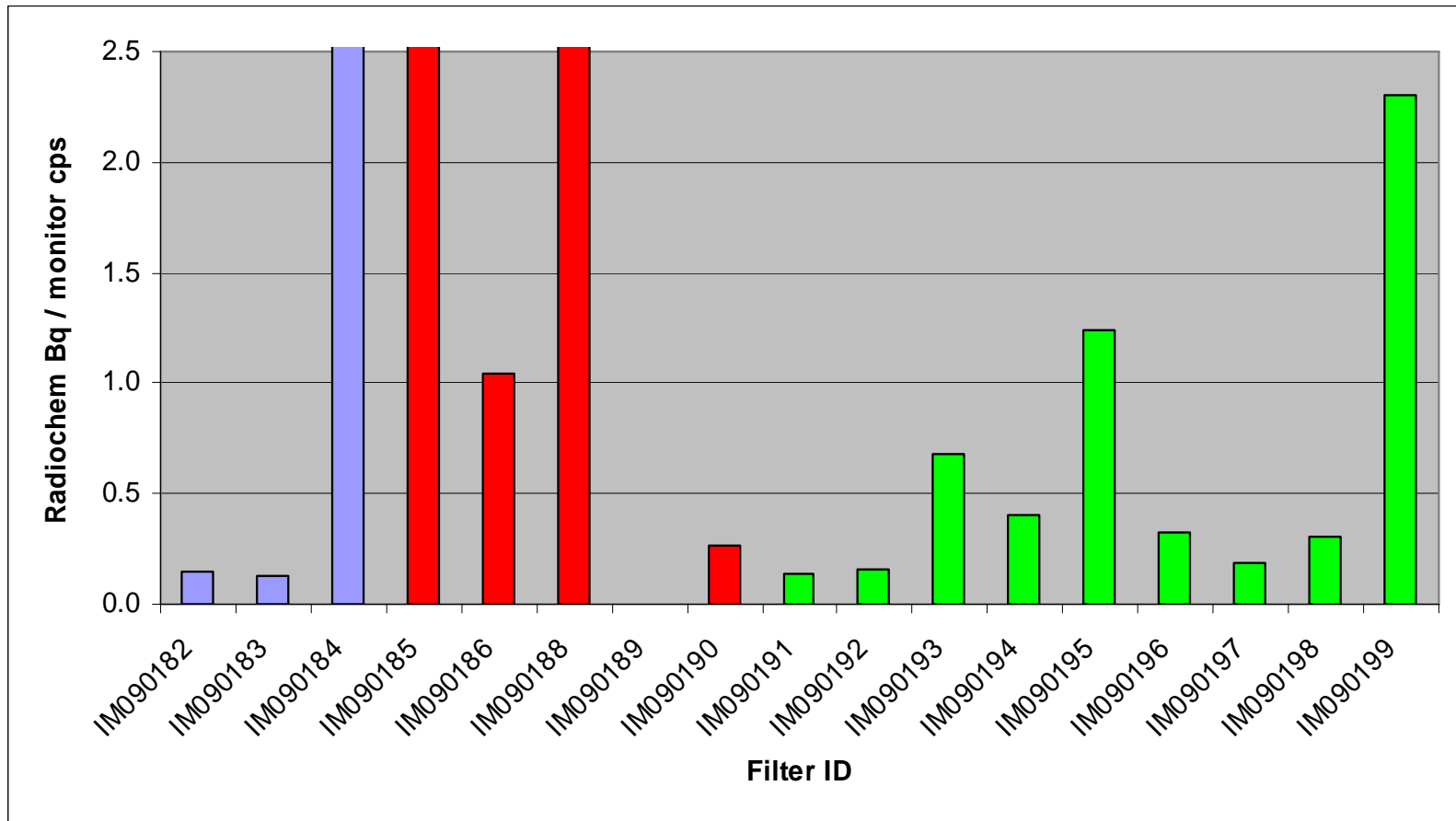
Provisional results for JCS



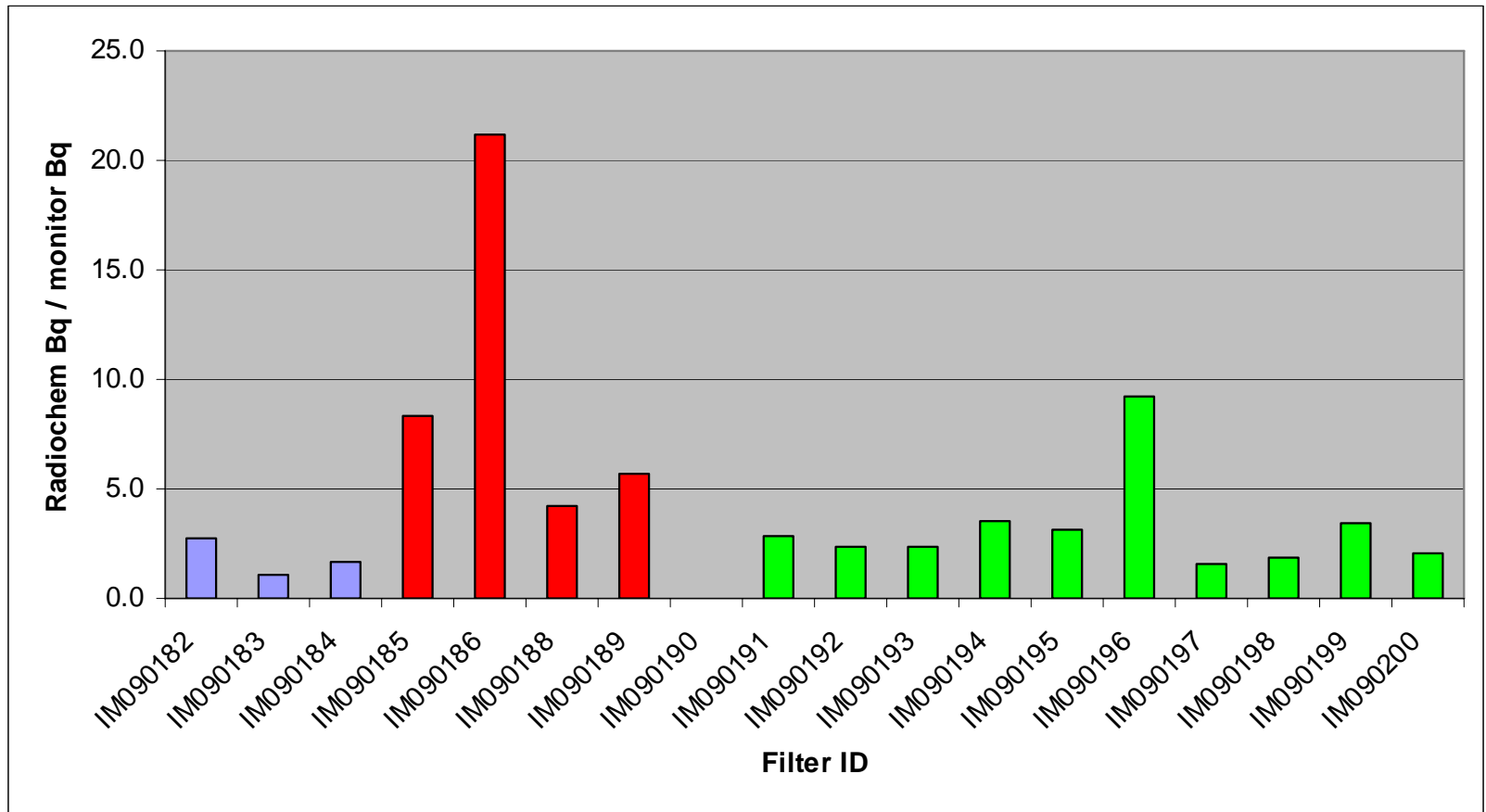
Provisional results for EP15



Provisional results for EP15 (detail)



Provisional results for AP2



Mean ratios of monitor data

- iSolo (Bq) / JCS (Bq): $0.684 \pm 3.9\%$
- iSolo (Bq) / EP15 (cps): $0.60 \pm 48\%$
- iSolo (Bq) / AP2 (Bq): $1.14 \pm 12\%$

Conclusions

- Data need more examination!
- For monitors used, true/apparent alpha activity ratios as high as 20 found, but most ratios in the range 1 – 5
- Apparent bias between monitors' responses

Acknowledgements

- Donor labs for their filters
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- Maria Garcia-Miranda (NPL radioactivity group) for filter dissolutions, separations, counting and analyses