EURADOS INTERCOMPARISON ON WHOLE BODY DOSEMETERS (2018)
- IC2018$_{ph}$ -

Special Cases

European Radiation Dosimetry Group

EURADOS

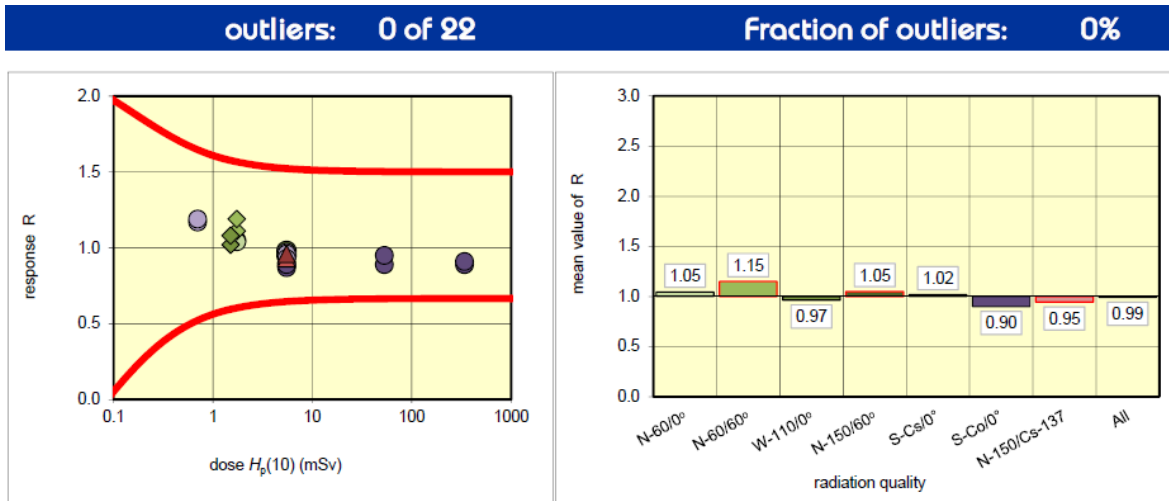# Irradiation plan was designed to check:
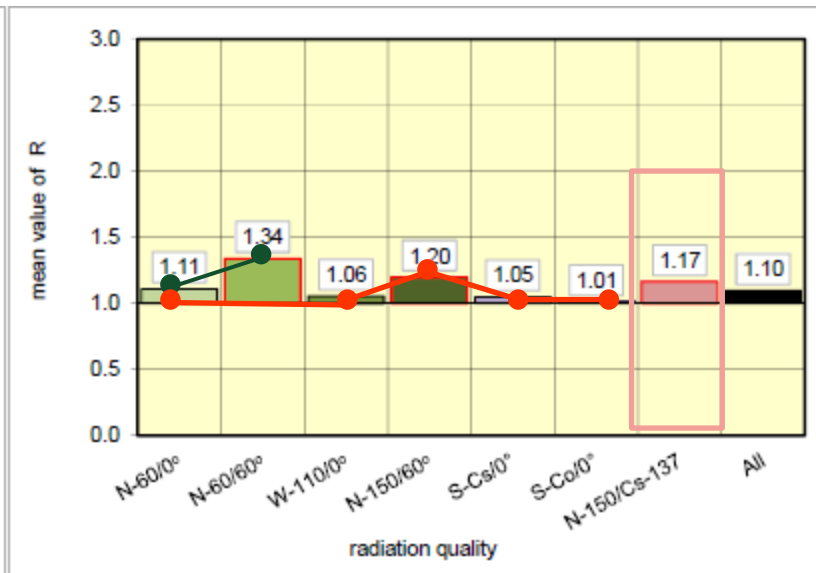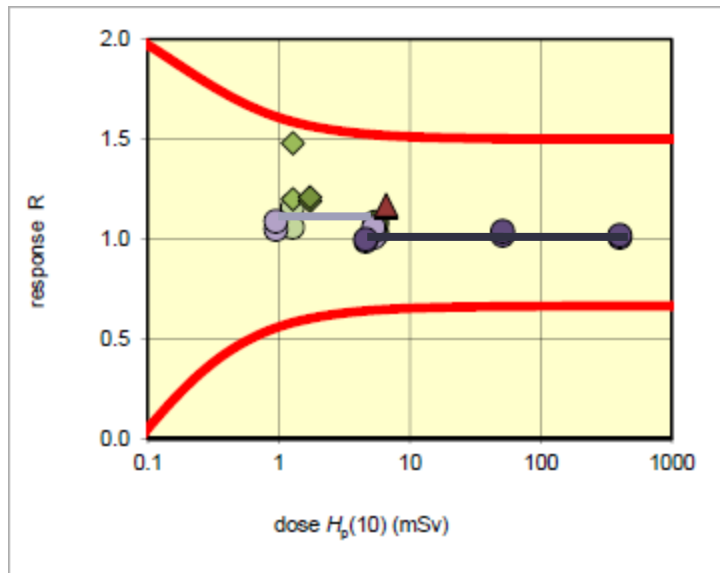
LINEARITY **ANGULAR RESPONSE** **ENERGY RESPONSE** **MIXED X-ray+GAMMA**

Compliance with ISO-14146:2010: "trumpet curves"

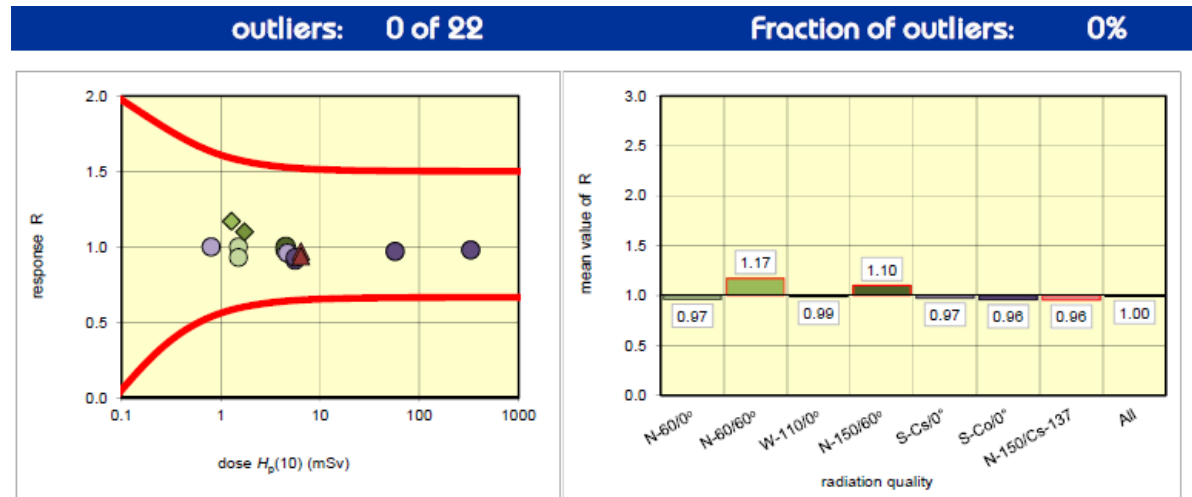# Examples of VERY GOOD $H_p(10)$ performance:
All type of systems
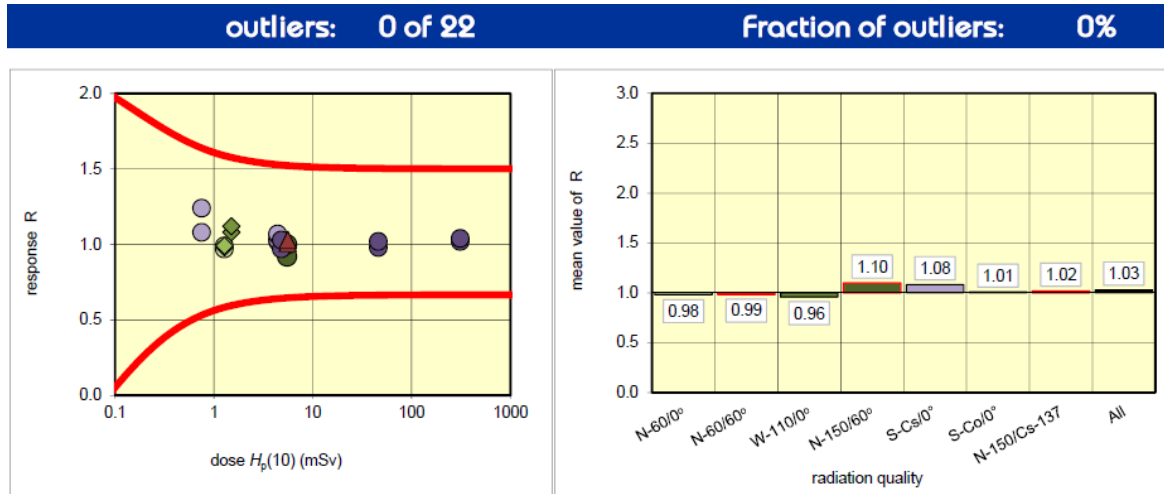
FILM (RID: 1)

Results: IC2018

TL (RID: 71)

ISO14146:2000 trumpet curve parameter: 1.5 / 0.085 mSv

Results: IC2018

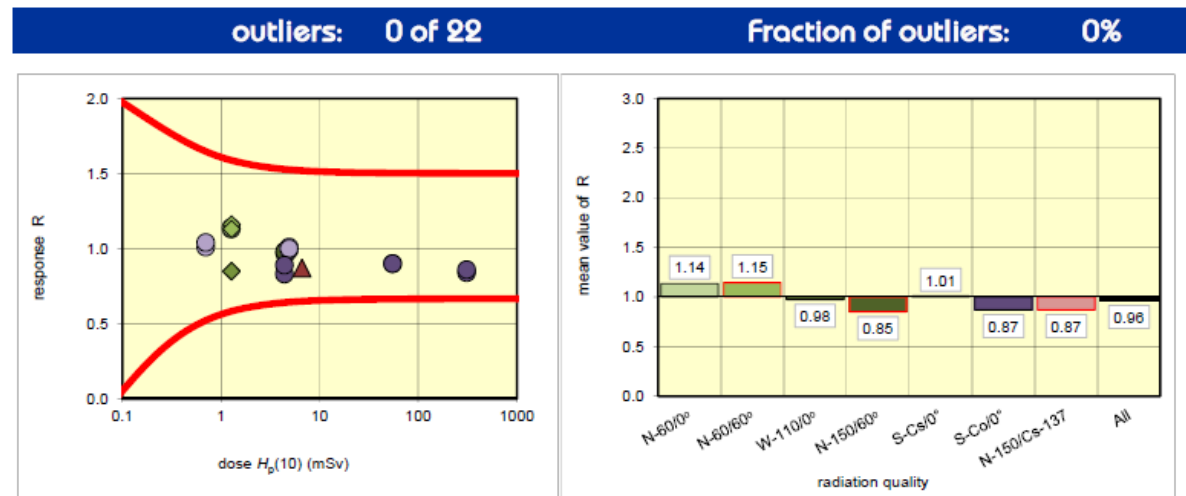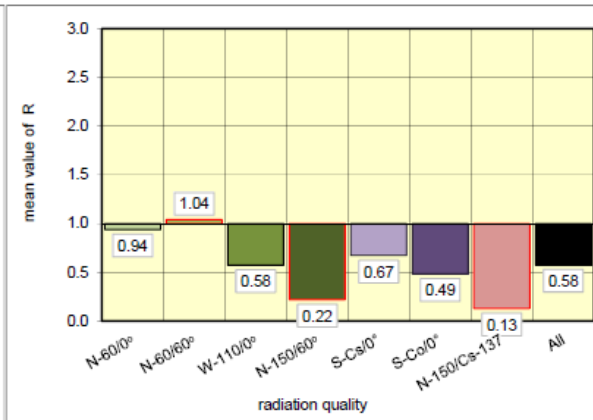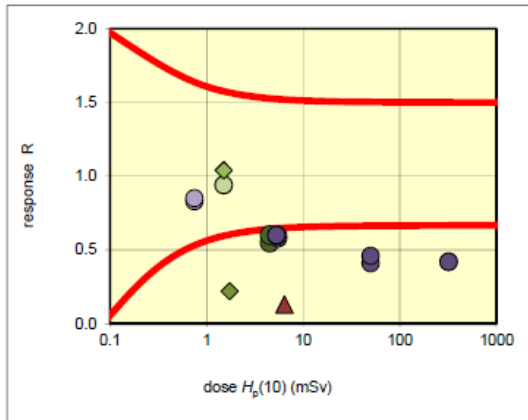# Examples of VERY GOOD H_p(10) performance:
All type of systems

OSL (RID: 25)

Other (RID: 119)

Examples of VERY POOR $H_p(10)$ performance:

FILM (RID: 2)

| outliers: | 16 of 22 | Fraction of outliers: | 73% |

ISO14146:2000 trumpet curve parameter: 1.5 / 0.085 mSv

Results: IC2018

Film and TLD only

OSL and Other ≤ 3 outliers

TL (RID: 108)

| outliers: | 10 of 22 | Fraction of outliers: | 45% |
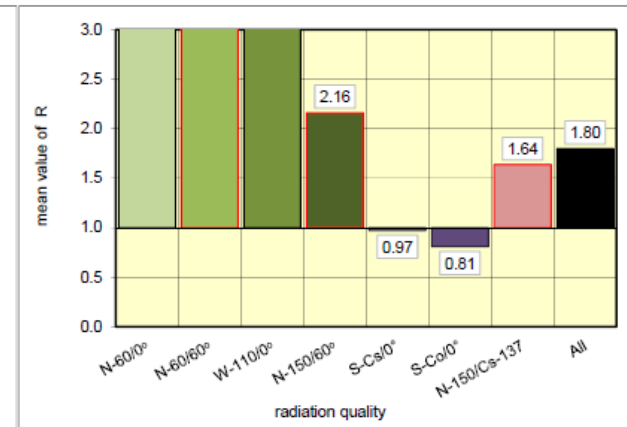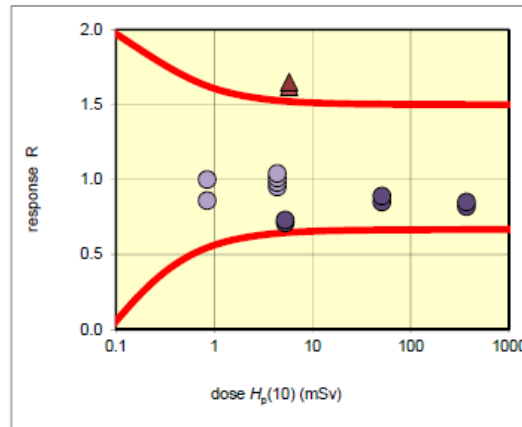
ISO14146:2000 trumpet curve parameter: 1.5 / 0.085 mSv
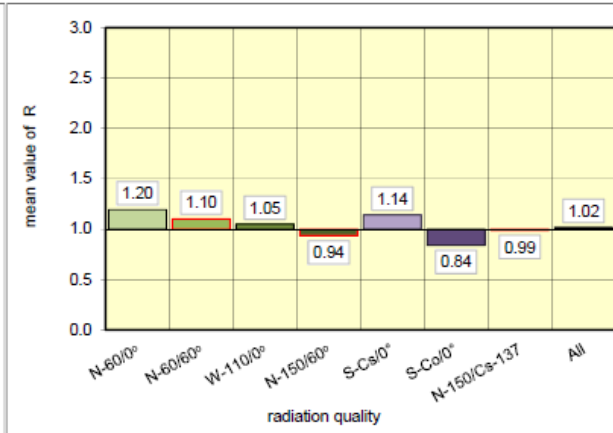
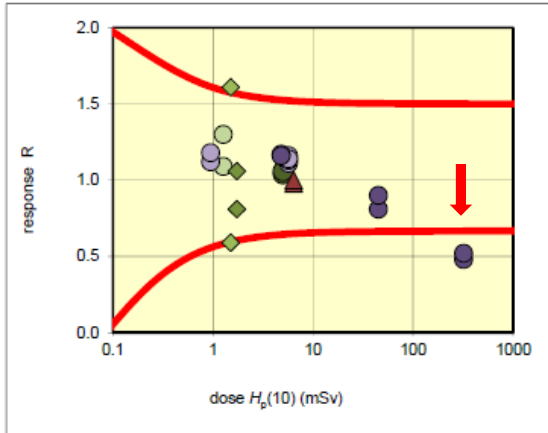8 points outside diagramme (> 2)

Results: IC2018

Linearity / High doses:

$H_p(10)$

Good linearity of most systems with few outliers for high S-Co doses

TL(RID: 46)

Sub-linear response

TL(RID: 49)
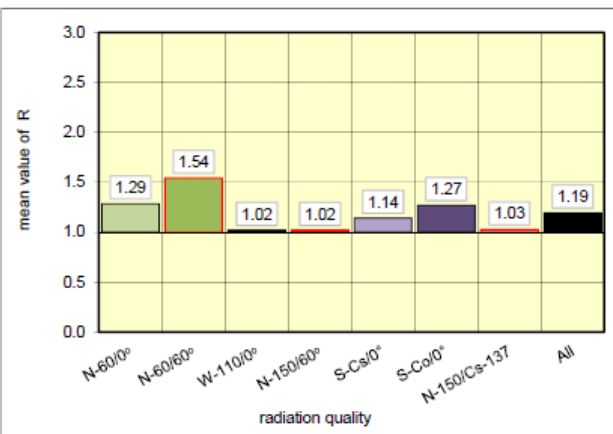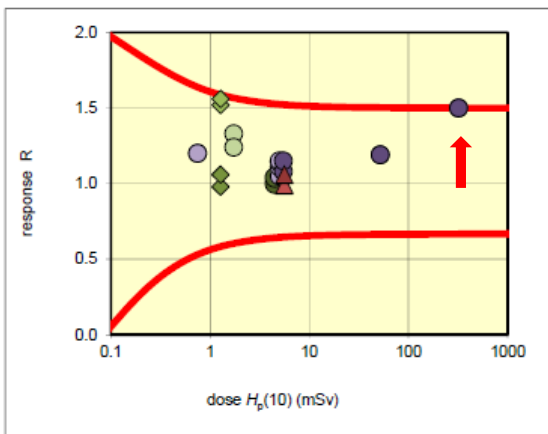
Supra-linear response

Angular response:

N60/60⁰ General trend: - over-response relative to N60/0⁰

TL (RID: 95)
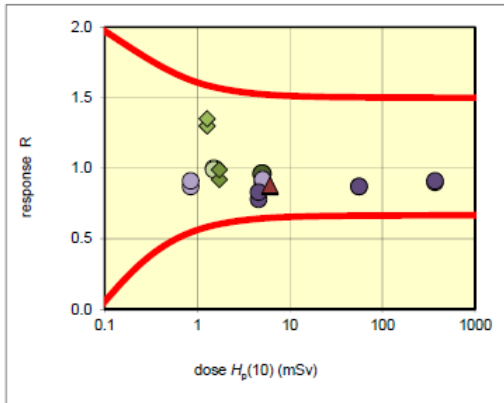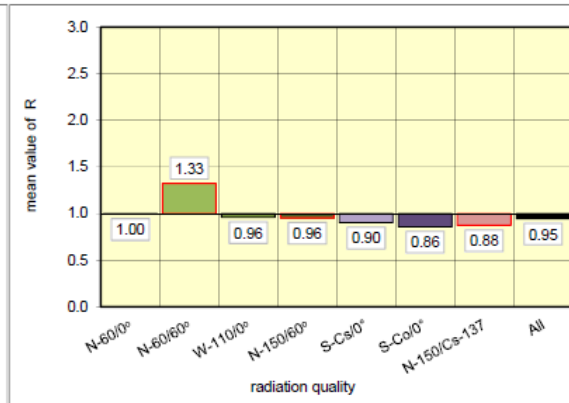
Good results with a clear angular dependence for N60:60⁰

TL (RID: 107)
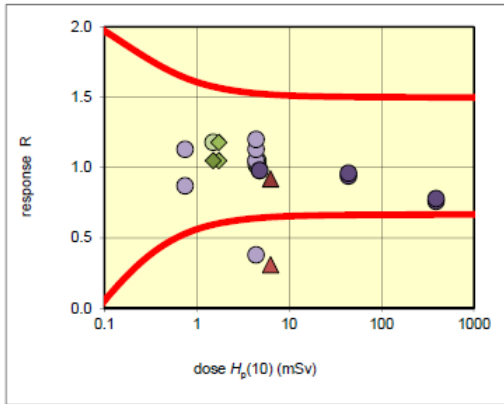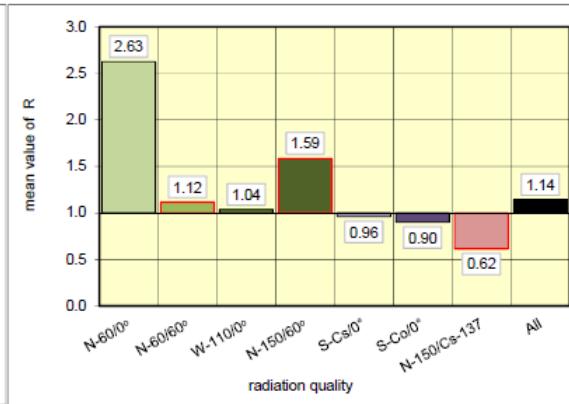
Anomalous response N60:0⁰

Angular response:

In general, same trend for N60:60⁰ and N150:60⁰ (over or under-response), but also:

Examples of angular response depending on x-ray energy:

FILM (RID: 6)

Good results but better angular response for N60:60⁰ than for N150:60⁰

Other (RID: 118)

Good results also but the opposite behavior

8

Energy response: $H_p(10)$

RID 108 (TL): only good for Cs and Co

| outliers: | 10 of 22 | Fraction of outliers: | 45% |

Results: IC2018   8 points outside diagramme (> 2)   trumpet curve parameter: 1.5 / 0.085 mSv
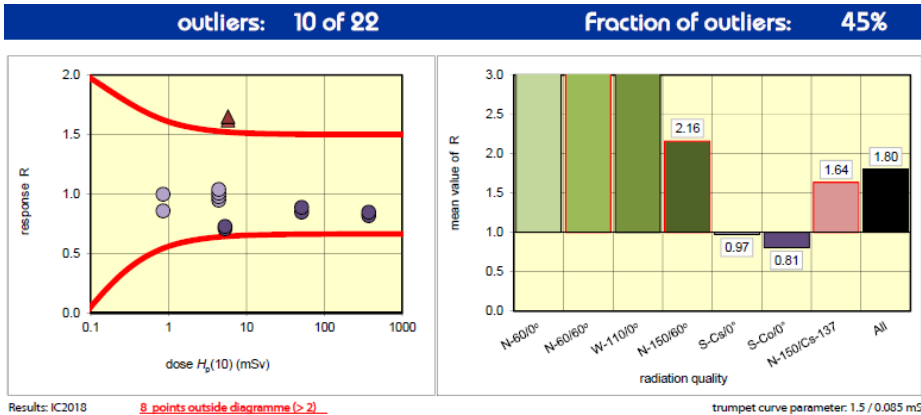
RID 48 (TL): many outliers but good energy response. **CALIBRATION PROBLEMS**

| outliers: | 18 of 22 | Fraction of outliers: | 82% |

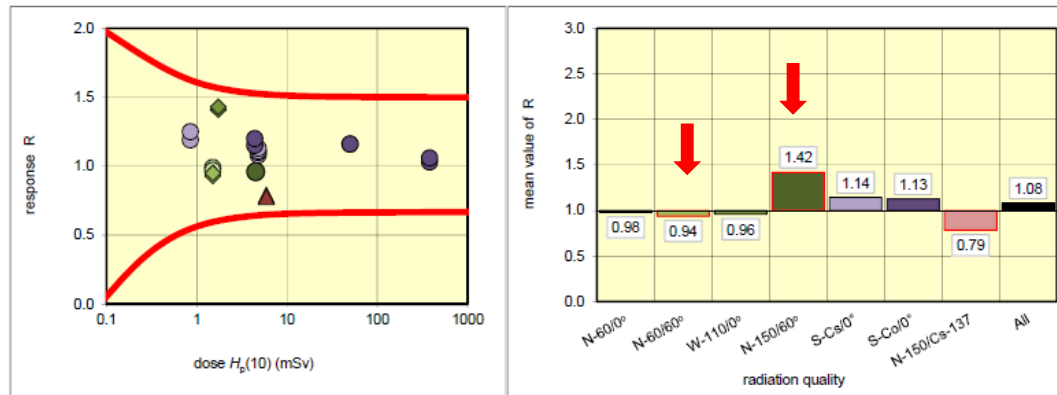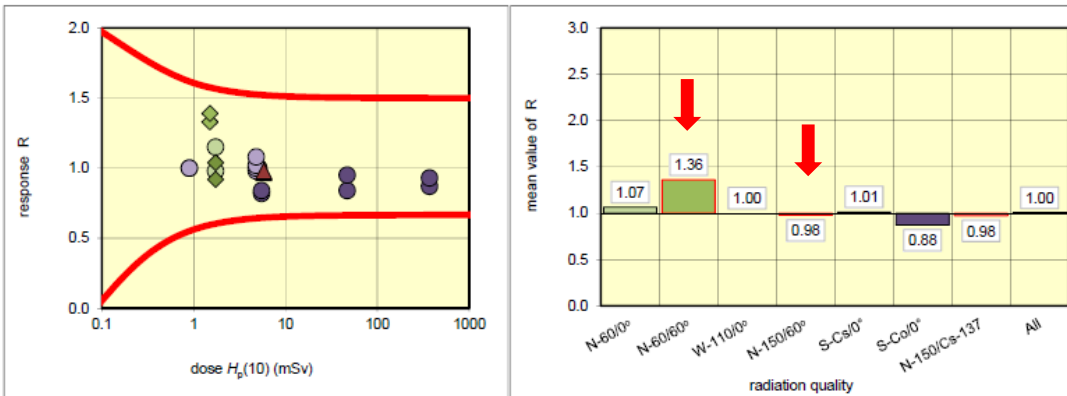Results: IC2018   trumpet curve parameter: 1.5 / 0.085 mSv
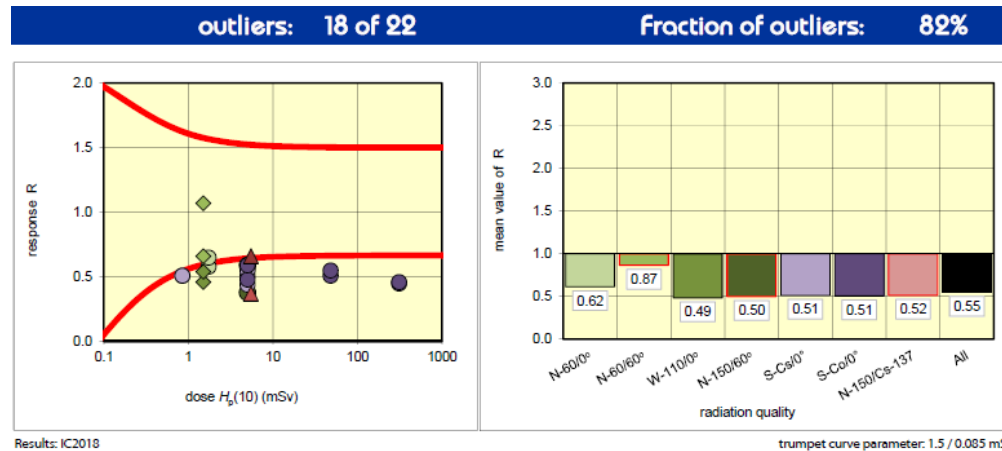
Mixed N150+S-Cs radiation:

$H_p(10)$

TL (RID: 38)
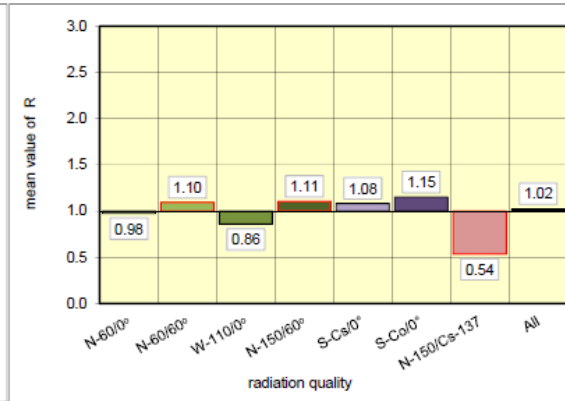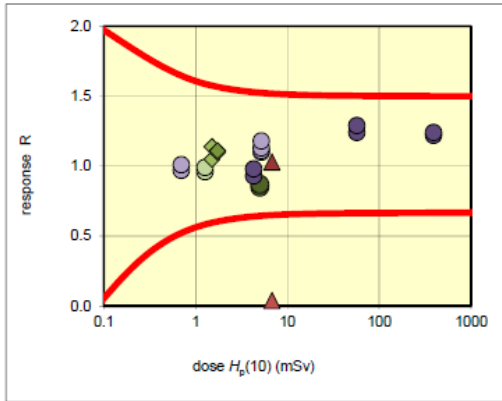
Good N150 and S-Cs responses but under-response of mean for mixed radiation (only 1 outlier)

TL (RID: 81)
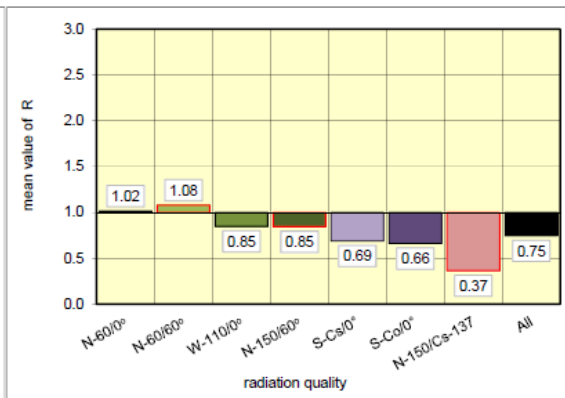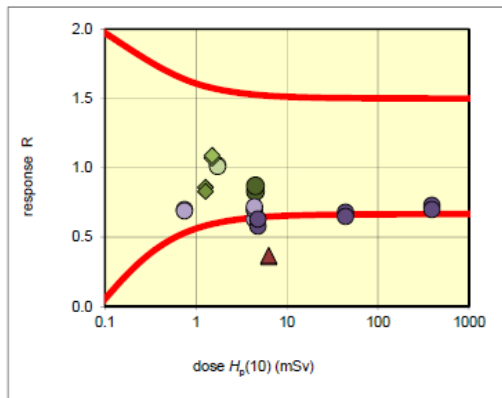
Under-response to N150 and S-Cs but much more pronounced for mixed radiation

Calibration procedure can improve results:
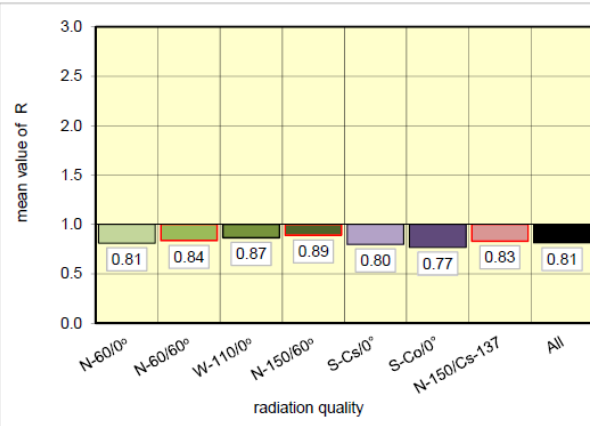
$H_p(10)$

TL (RID: 33)

Good results that can be improved by calibration factor

TL (RID: 40)
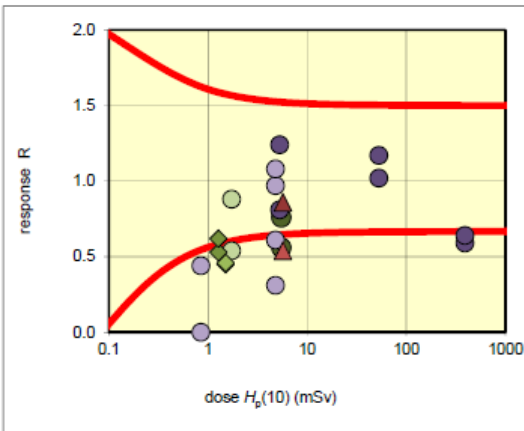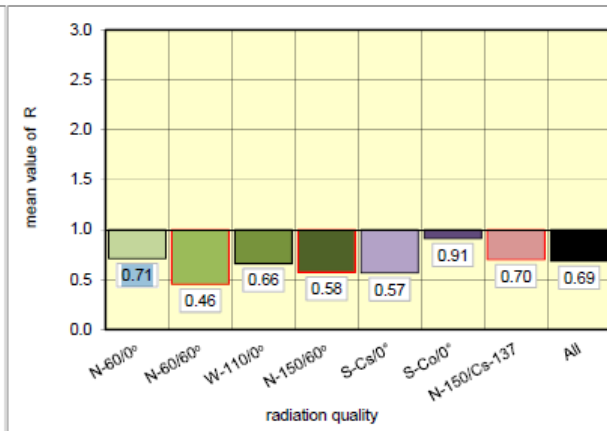
Number of outliers would be reduced by ….

Conclusions:

- Wide variation of performance for systems of the same type. Good procedures can produce good results with all type of systems.

- OSL and Other systems present very few outliers.

- High dose performance has improved compared with previous intercomparisons.

- Improvements are possible by checking calibration procedures, dose algorithms and badge design.

- This presentation dealt only with $H_p(10)$ results but the same conclusions can be drawn from $H_p(0.07)$ results, as the trends are usually the same for both quantities.