

# New version of ANSI N42.13

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# ANSI

- American National Standards Institute
- Consensus standards
- Writing Groups
  - Trade, technical, and professional organizations; government agencies; and consumer groups
- ANSI N42 – Nuclear instruments
- ANSI N42.2 – Calibration of nuclear instruments

# ANSI, cont.

- Audience
  - Technical users - guidance
  - Regulatory agencies – reference for regulatory guides
  - Instrument manufacturers – reference for writing instruction manuals

# ANSI, cont.

- Content
  - Scope
  - Calibration
    - Method
    - Frequency
    - Types of standards to be used
  - Procedures
    - Making measurements
    - Assessing errors
  - Potential problems

# ANSI N42.13

- Calibration and Usage of "Dose Calibrator" Ionization Chambers for the Assay of Radionuclides
- Writing Group
  - Jeffrey Cessna, Chair
  - Uve Beinlich, QSA
  - Brian Zimmerman, NIST
  - Joe DeCicco, NRC
  - Mary Anne Dell, Capintec
  - Jeff Norenberg, UNM
- rewrite of N42.13-1978, N42.13-1986

# Other Guidance Documents

- NPL Good Practice Guide No. 93
  - Protocol for Establishing and Maintaining the Calibration of Medical Radionuclide Calibrators and their Quality Control (2006)
- IAEA Technical Reports Series No. 454
  - Quality Assurance for Radioactivity Measurement in Nuclear Medicine (2006)

# Even more

- SCHRADER, H., Activity Measurements with Ionization Chambers, Monographie BIPM-4, Bureau international des poids et mesures, Sèvres (1997).
- INTERNATIONAL ELECTROTECHNICAL COMMISSION, Medical Electrical Equipment: Radionuclide Calibrators – Particular Methods for Describing Performance, IEC 61303(1994-10), IEC, Geneva (1994).
- INTERNATIONAL ELECTROTECHNICAL COMMISSION, Calibration and Usage of Ionization Chamber Systems for Assay of Radionuclides, IEC 61145(1992-05), IEC, Geneva (1992).

# Scope

- Measurement of Activity
- Not, Measurement of Dose
- 1<sup>st</sup> draft (previous writing group chair)
  - Combined standard for Activity and Dose
  - Differing methodologies
- 2<sup>nd</sup> draft
  - Split
  - Created a need for a separate standard

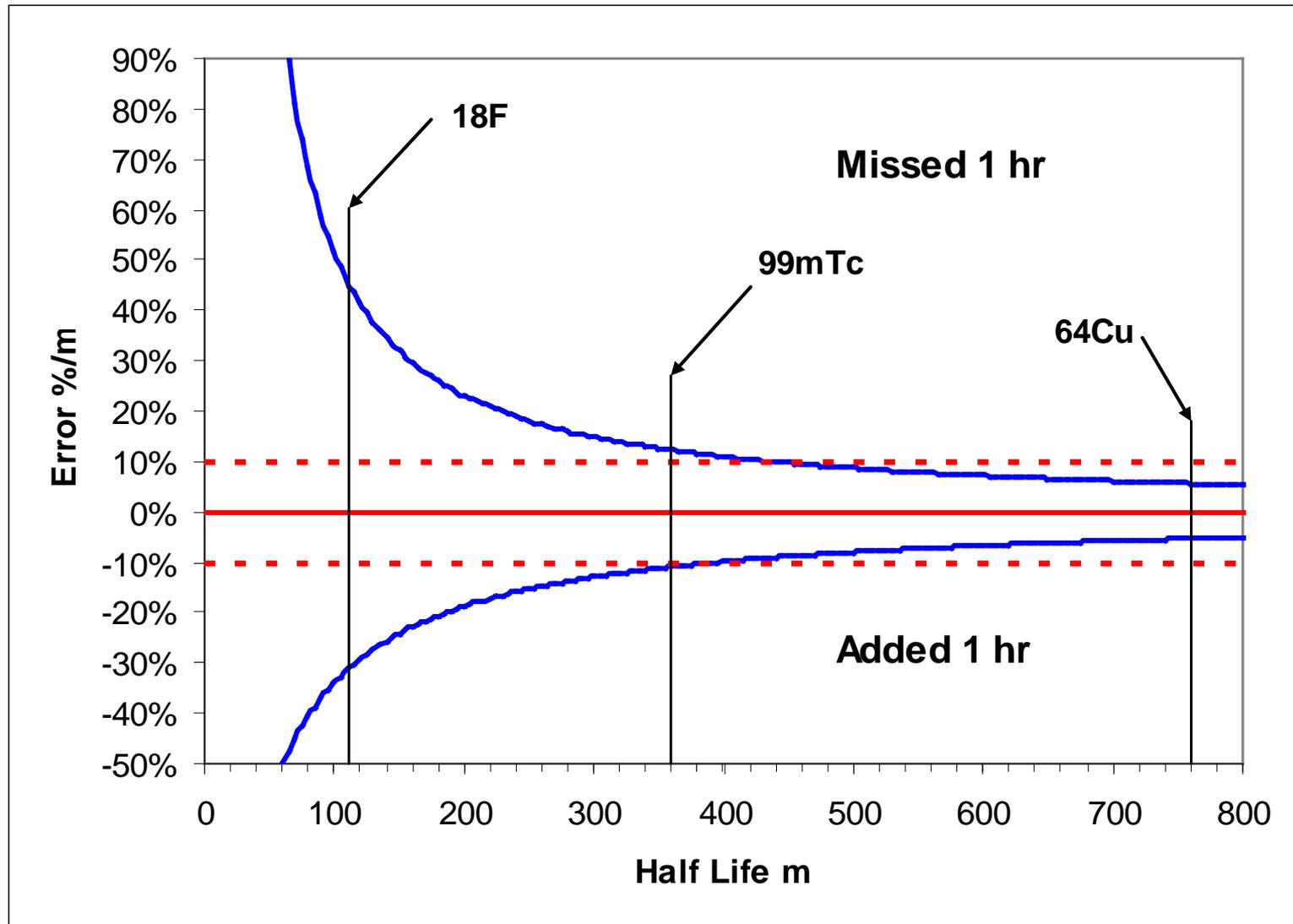
# Recommendations

|                 | Acceptance/<br>After Repair | Daily | Annually | Acceptance |
|-----------------|-----------------------------|-------|----------|------------|
| Accuracy        | ✓                           |       | ✓        | 10%        |
| Reproducibility | ✓                           |       | ✓        | 5%         |
| Linearity       | ✓                           |       | ✓        | 5%         |
| Zero            | ✓                           | ✓     |          |            |
| High Voltage    | ✓                           | ✓     |          |            |
| Background      | ✓                           | ✓     |          |            |
| Clock           | ✓                           | ✓     |          | 15 min     |
| Check Source    | ✓                           | ✓     |          | 5%         |

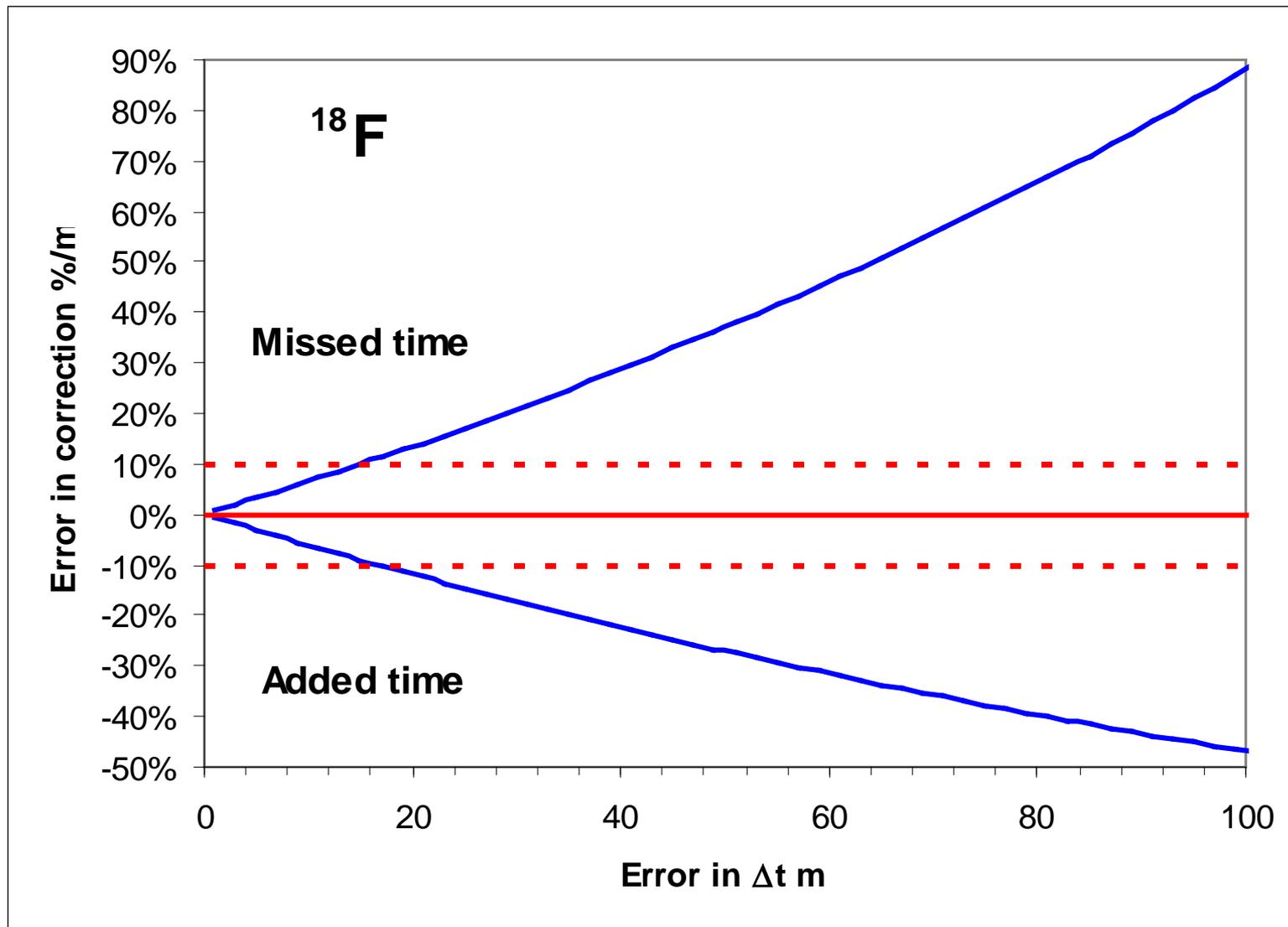
# New

- Table of required tests, acceptable outcome
- Bibliography
  - Incl. Zimmerman Determination of Dial Settings
- Time Keeping
  - Synchronization of clocks to NMI
  - Recording of time zone
  - Examples of poor time keeping

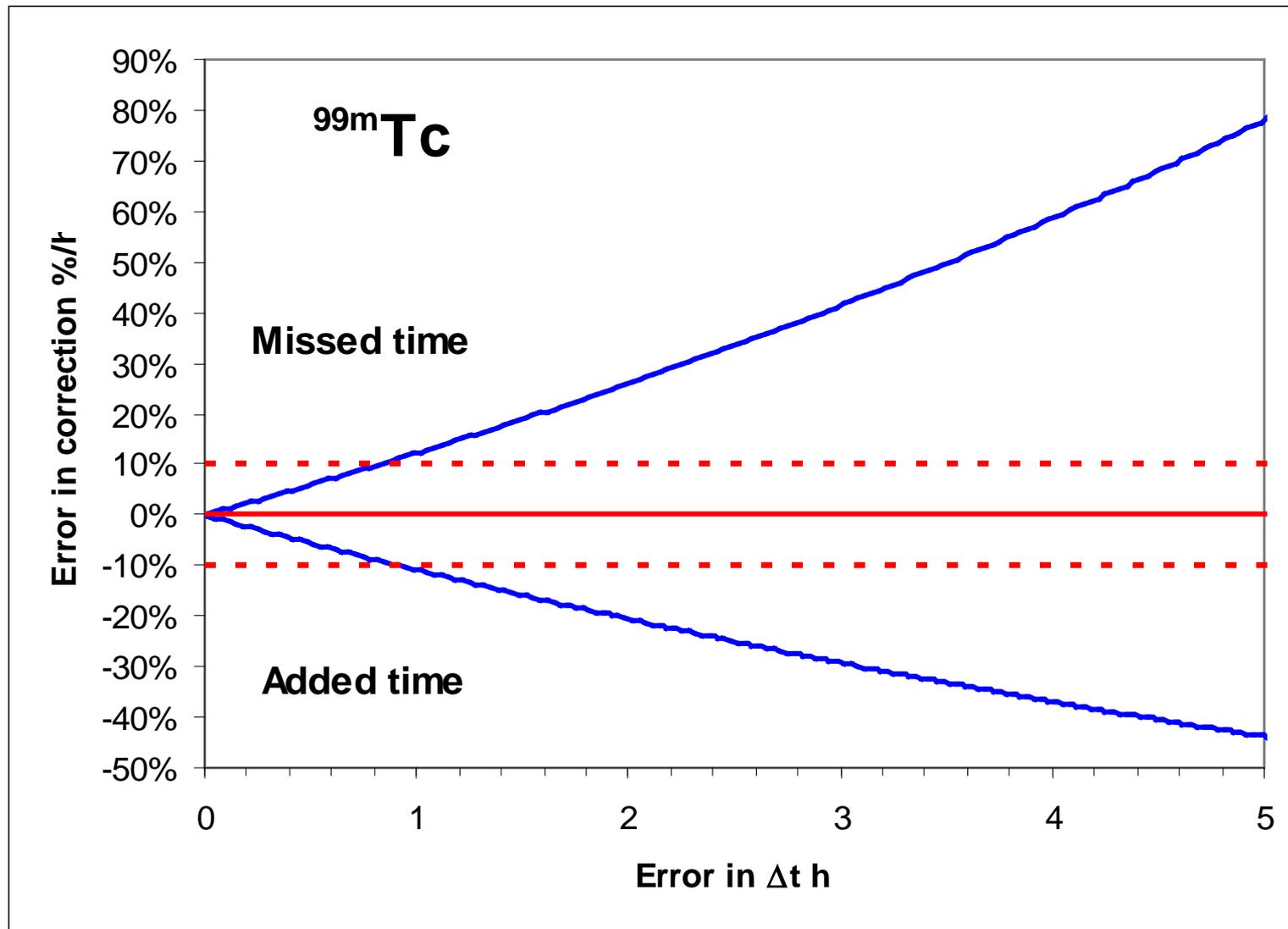
# Effect of 1 hour on decay correction



# Incorrect $\Delta t$ for $^{18}\text{F}$



# Incorrect $\Delta t$ for $^{99m}\text{Tc}$



Discussion?