



U.S. DEPARTMENT OF  
**ENERGY**

**Nuclear Energy**

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The United States Department of Energy  
Laboratory Accreditation Program  
(DOELAP)

Assuring the Quality of Internal Radioactive Excreta  
and In-Vivo Measurements through Performance  
Testing

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U.S. Department of Energy



# Internal Dosimetry

- Internal Dose Calculations are based on excreta or In-Vivo measurements.
- Assumptions are made.
- Results are plugged into biokinetic models.
- Dose is calculated.
- Simple and Straightforward.
  
- Or is it?



# Internal Dosimetry

- How do you know the bioassay measurements have any validity to them whatsoever?
- You Don't – Unless.....

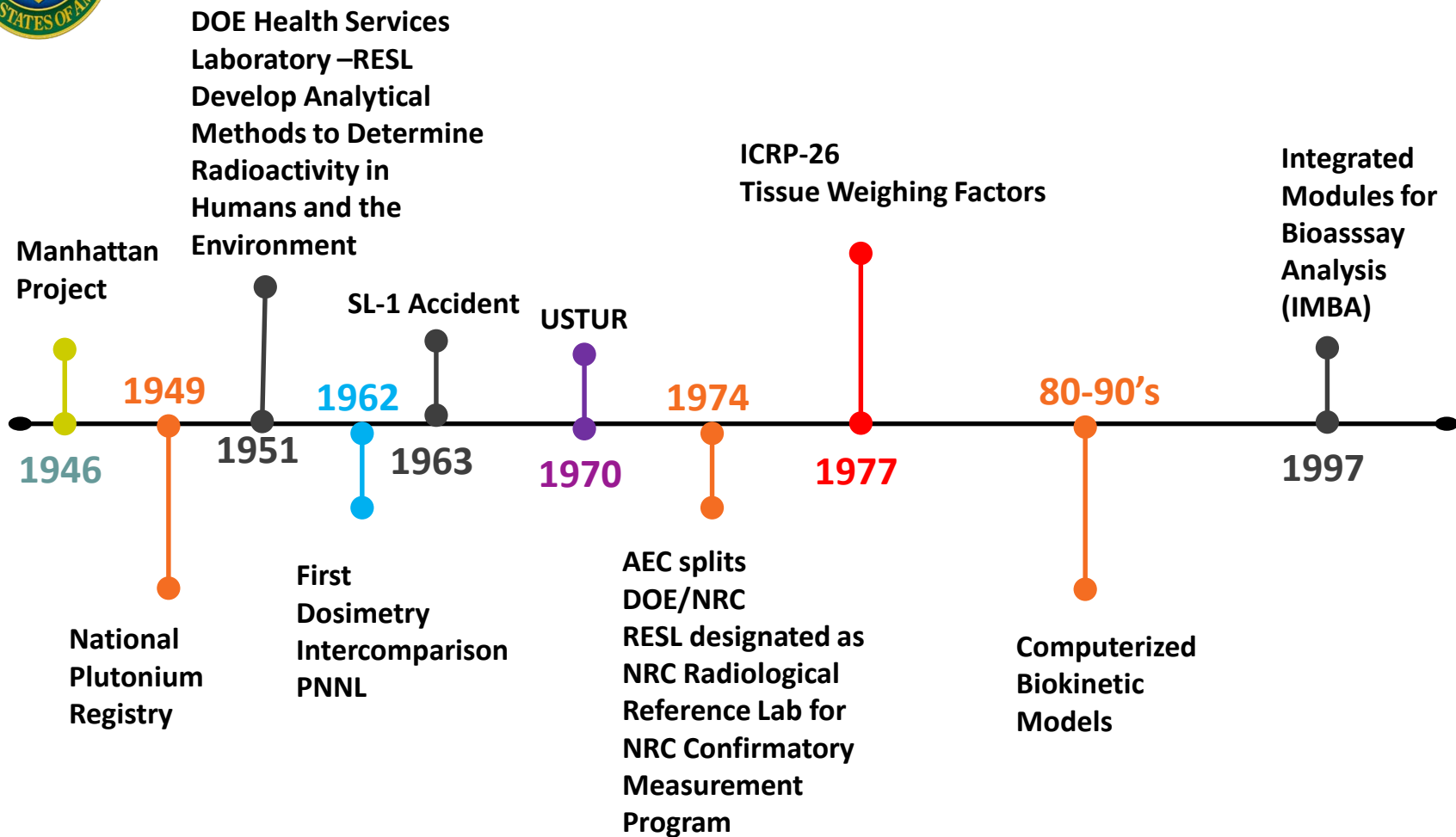


# TOPICS

- Short History of Internal Dosimetry
- General Assumption of Laboratory Capability
- The Answer
- Short History of Performance Testing
- DOE Laboratory Accreditation Program
- Dosimetry Intercomparison Exercise



# Internal Dosimetry Timeline





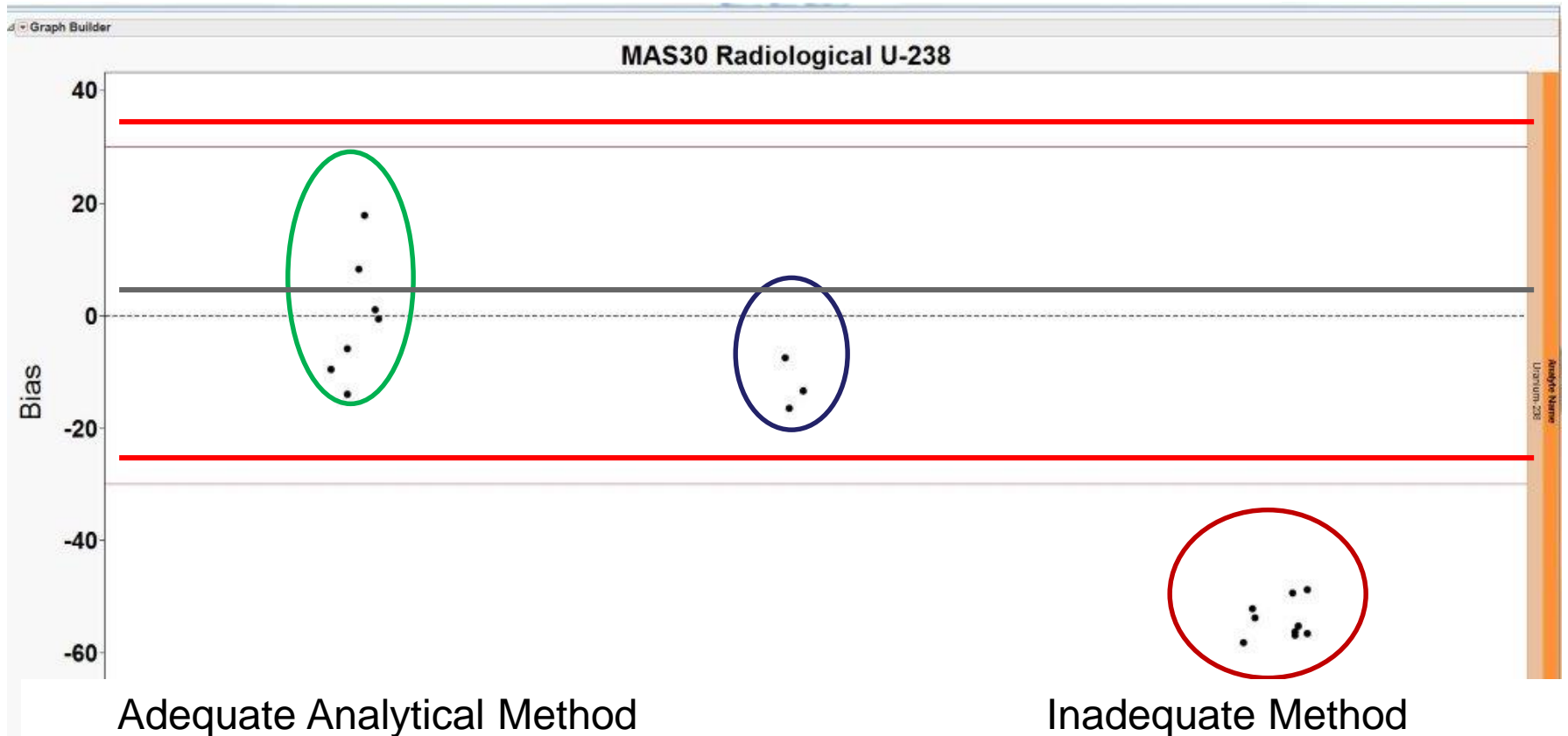
# Laboratory Capability

- There is a belief, that if you follow a procedure, the results obtained are adequate and acceptable whether or not they are accurate and convey what is actually present in the sample.
- This thought process makes inaccurate results acceptable simply because an inadequate procedure was followed and documented.



# U-238 in soil

Shown are 18 Lab data out of 45 reported. Only 10 passed.  
27 Labs reported zero....





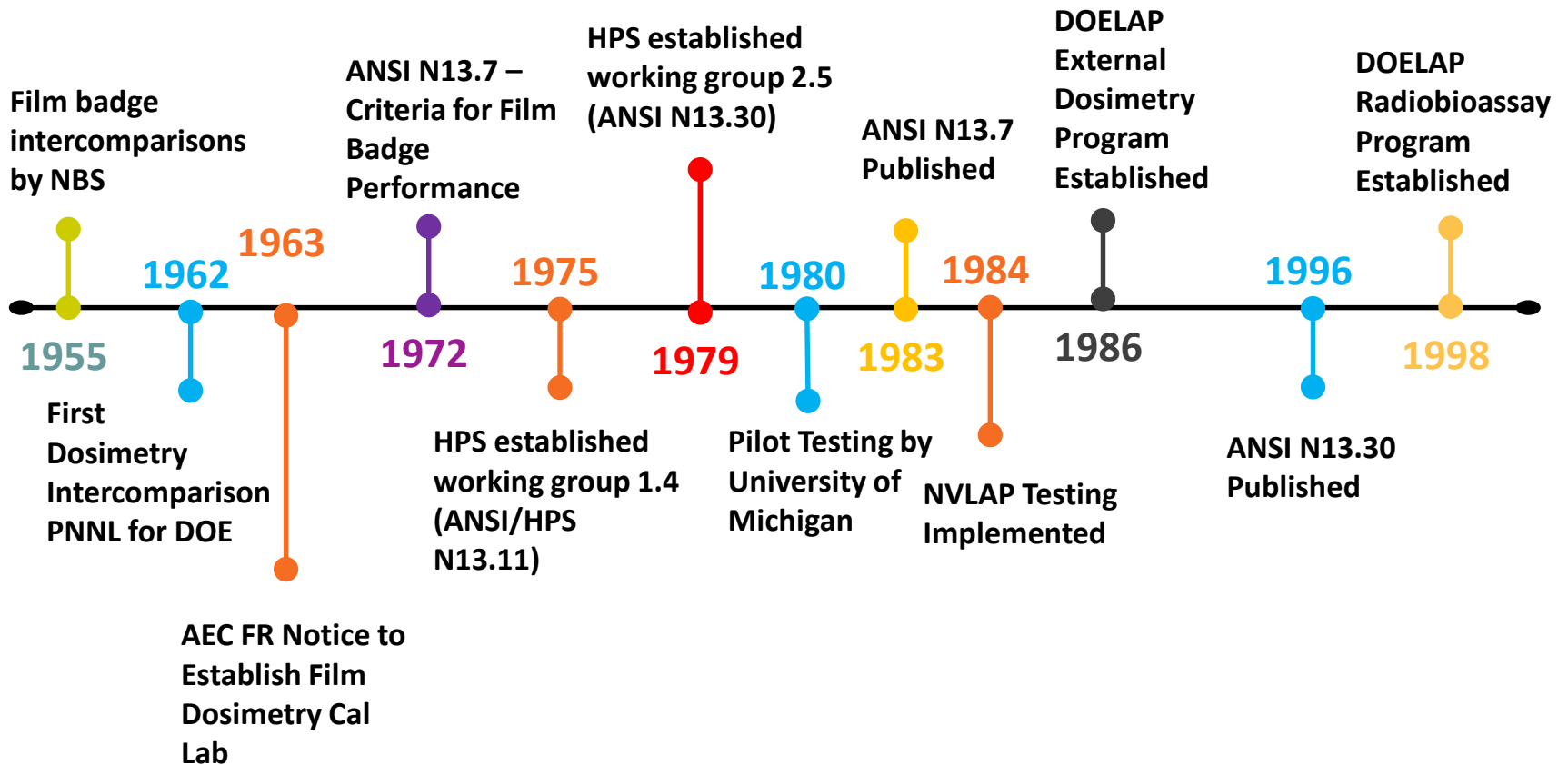
# The Answer – Verify Capability!

- Ensure that the laboratory can perform and sustain their measurement systems
- Performance Testing
  - Accuracy
  - Sensitivity – low level
  - Zero's – in the presence of interference
  - Single Blind – laboratory knows
  - Double Blind – samples appear as normal samples
- Quality Assurance System
  - Self Assessment
  - External Assessment





# Timeline



# DOE Laboratory Accreditation Program (DOELAP)

- Required for DOE by 10 CFR 835
- Administered by the DOE Office of the Associate Undersecretary for Environment, Health, Safety and Security (AU)
  - AU-10 Office of Health and Safety
    - Dr. Patricia Worthington – Director
  - AU-11 Office of Worker Safety and Health Policy
    - James Dillard – Director/DOELAP Administrator
- Radiation and Environmental Sciences Laboratory
  - DOELAP Performance Testing Laboratory
  - All Feds – no conflict of interest



# DOE Laboratory Accreditation Program (DOELAP)

## Application

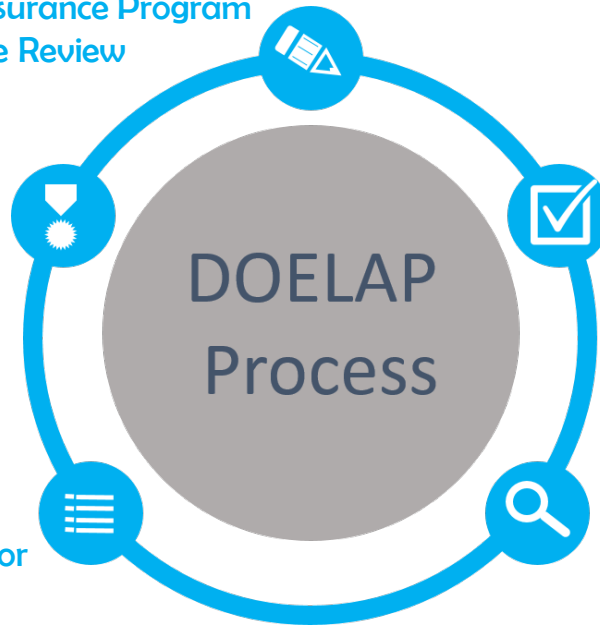
- Quality Assurance Program
- Field Office Review

## Accreditation

- Period of 3 years
- Notify DOELAP of changes

## Oversight Board Review

- Complete Package
- Recommendations to Administrator



## Performance Testing

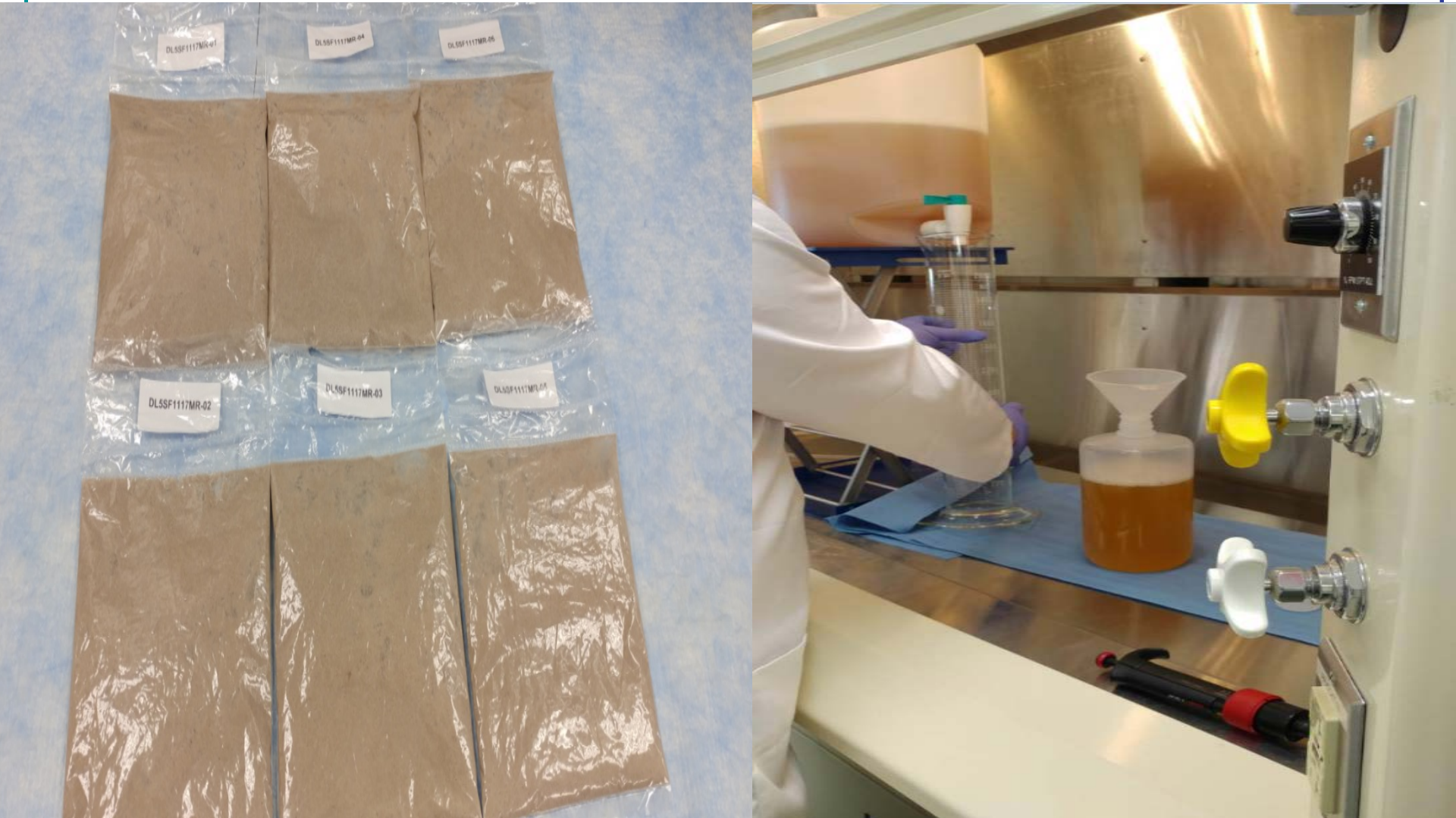
- ANSI N13.11, *Personnel Dosimetry Performance Criteria and Testing*
- ANSI N13.32, *Performance Testing for Extremity Dosimeters*
- ANSI N13.30, *Performance Criteria for Radiobioassay*

## On-Site Assessment

- Direct observation and evaluation
- Conducted by technical experts



# Performance Testing Samples





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# Performance Testing Samples



# RESL – Pedigree

NIST/RESL Radiological  
Traceability Program

Accredited to ISO/IEC-17025  
ISO Quality Standard for  
Laboratory Operations &  
External Dosimetry

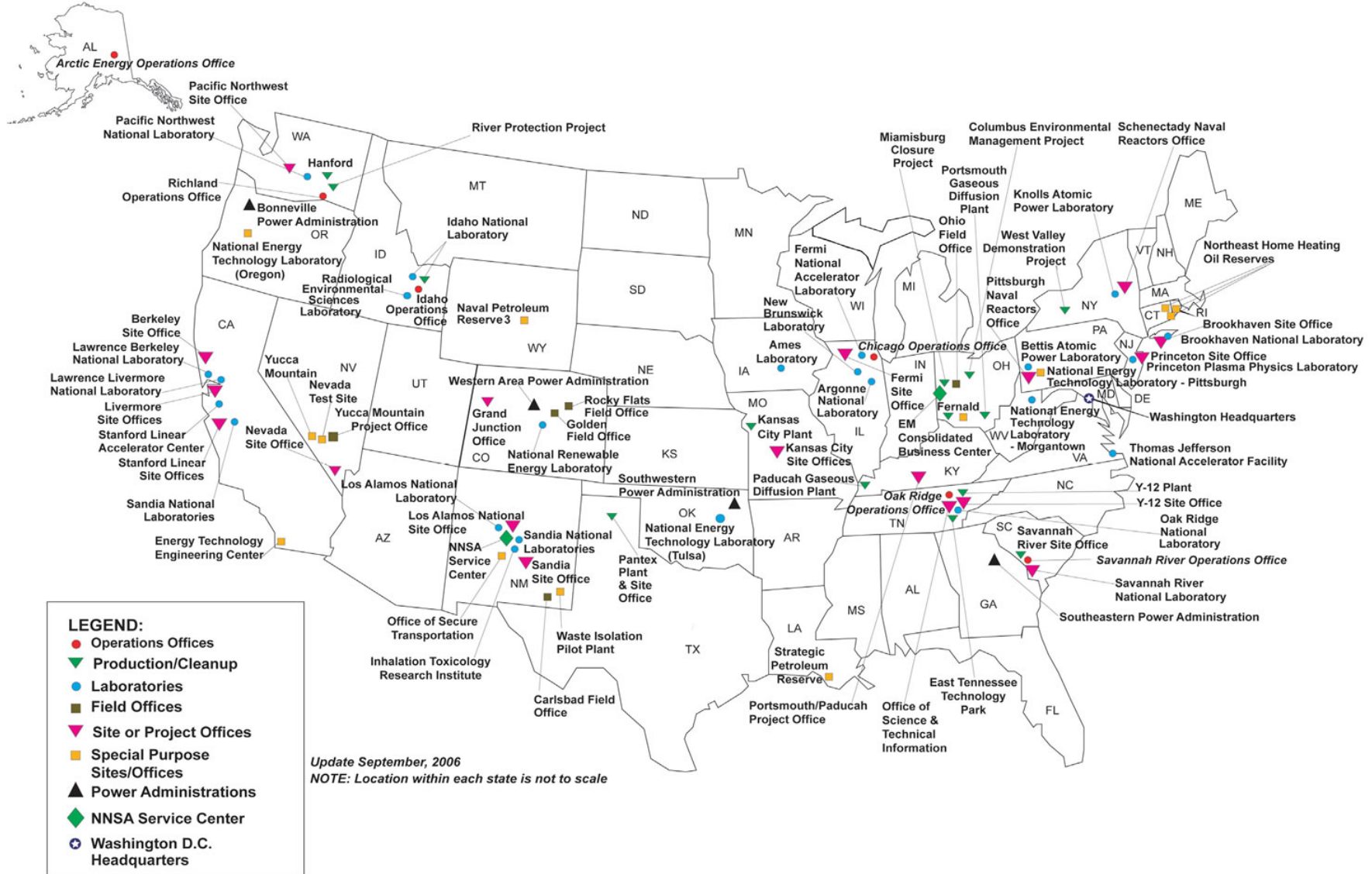
Accredited to ISO/IEC-17043  
General Requirements for  
Proficiency Testing

Accredited to ISO/IEC-17034  
General Requirements for  
Certified Reference Material  
Provider



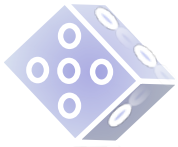


# DOE Accredited Sites





# *DICE* – *Dosimetry Intercomparison Exercise*



Opportunity to compare techniques for intake and dose determination.

Case descriptions, bioassay data, and result forms will be sent to each participant. A compilation of the results and methods submitted will be released to participants for their edification

A follow-up workshop is scheduled to allow an open discussion on the cases and the methods used for intake and dose assessment.

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# Questions

**Please feel free to contact me.**

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