



# Independent Verification Role In Environmental Cleanup

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Term Stewardship  
Conference**



# What is Independent Verification (IV)?

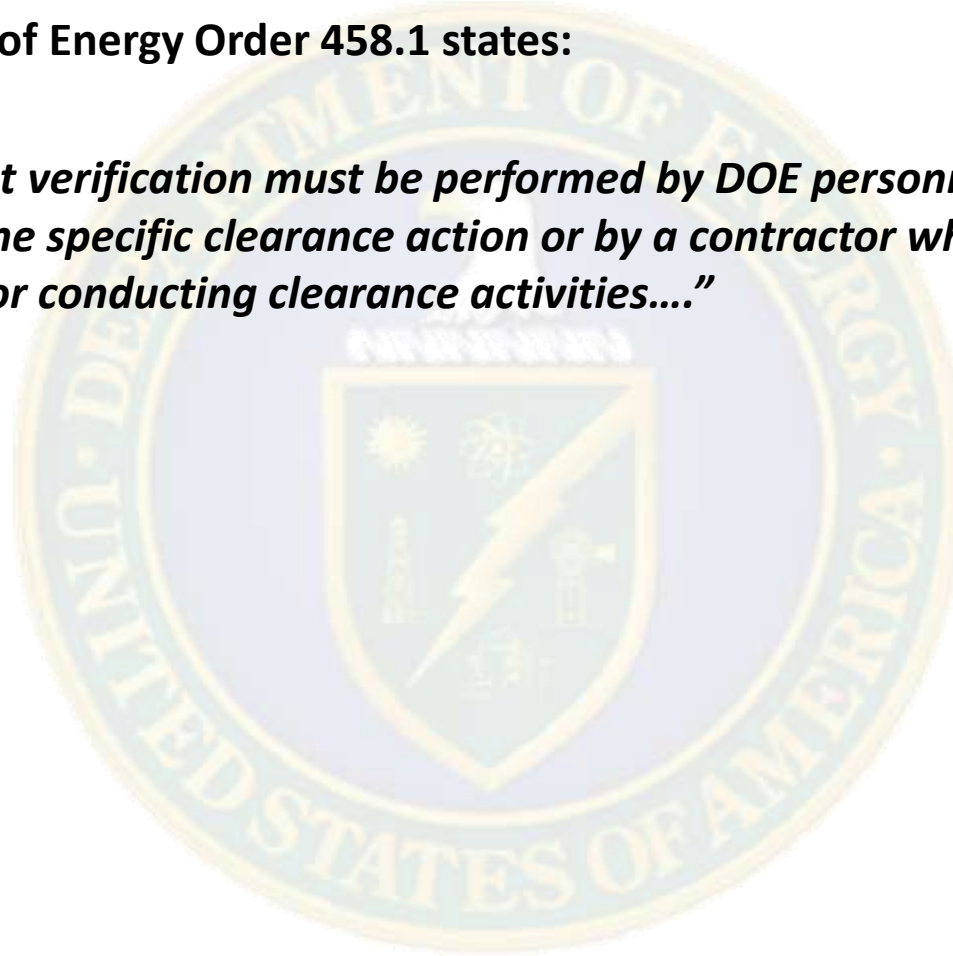
- Performed by the regulator (or independent contractor)
- Substantiates the results of:
  - Characterization
  - Remediation
  - Final release surveys
- Verifies that site final condition is acceptable, relative to applicable criteria



# Who can perform IV?

- Department of Energy Order 458.1 states:

*“Independent verification must be performed by DOE personnel not directly involved in the specific clearance action or by a contractor who is independent of the contractor conducting clearance activities...”*



# Why is Independence Important?

- The DOE and other federal agencies spend billions of dollars cleaning up contaminated sites each year
- The DOE must assure cleanup at their sites is done right
- The ultimate safety of these sites is of great concern
- An objective and independent organization enhances public confidence
- Autonomy provides assurance that the data is untainted by commercial interests



# Regulatory Drivers—DOE

- Department of Energy Order (DOE O 458.1)
  - The **graded approach** to IV must be commensurate with the **scope, complexity, and risk** associated with the clearance action to ensure at a minimum that procedures, instruments, data and analysis, and documentation are adequate.
  - **Personal property releases** must at a minimum include operational awareness of radiological survey procedures, instrumentation, methodologies, and techniques. Additional IV may be required for high-complexity releases or for contractors with a history of poor performance.
  - All **real property releases** must include review of data and reporting and may also include independent surveys or sample analysis.
  - **Real property transferred to the public** or managed by another agency requires the development of an IV plan and performance of IV surveys and sampling.



# Regulatory Drivers—NRC



- Consolidated Decommissioning Guidance (NUREG-1757)
  - NRC regulations do not include specific requirements for the confirmatory survey, NUREG provides guidance
  - In practice, IV is **typically required** for unrestricted release of **land**
  - Referred to as the **“Confirmatory Survey”**
  - Higher priority at sites that may pose a greater potential threat to the public health and safety
  - Performed at various stages of the decommissioning process
  - Recommends use of the Multi-Agency Radiation Survey and Site Investigation Manual (**MARSSIM**) for Final Status Survey (FSS)
  - Recommends in-process IV (with subsequent partial site releases) versus one final site-wide confirmatory survey



# Benefits of IV



- **Avoids schedule delays and cost increases by identifying issues early in cleanup process**
- **Ensures decontamination and decommissioning (D&D) plans and reports are technically sound**

- **Provides real-time corrective actions if areas of concern are identified**
- **Issues solid and defensible documentation to validate compliance with cleanup requirements and avoid possible future litigation**



# IV – Big Picture

- 1) Document Reviews
- 2) In-Process Evaluations
- 3) Independent Sampling and Analysis
- 4) Independent Field Surveys
- 5) Report Preparation





# Real and Non-Real Property Defined

- **Personal Property**: Property of any kind, except for real estate and interests therein (such as easements and rights-of-way) and permanent fixtures...\*
- **Real Property**: Refers to land and anything permanently affixed to the land such as buildings, fences, and those things attached to buildings, such as light fixtures, plumbing and heating fixtures, or other such items, that would be personal property if not attached.\*

\* Per DOE Office of Environmental Management Plan for the Approval and Independent Verification of Authorized Limits (i.e., Radiological Release Limits) Office of Engineering and Technology Office May 2008



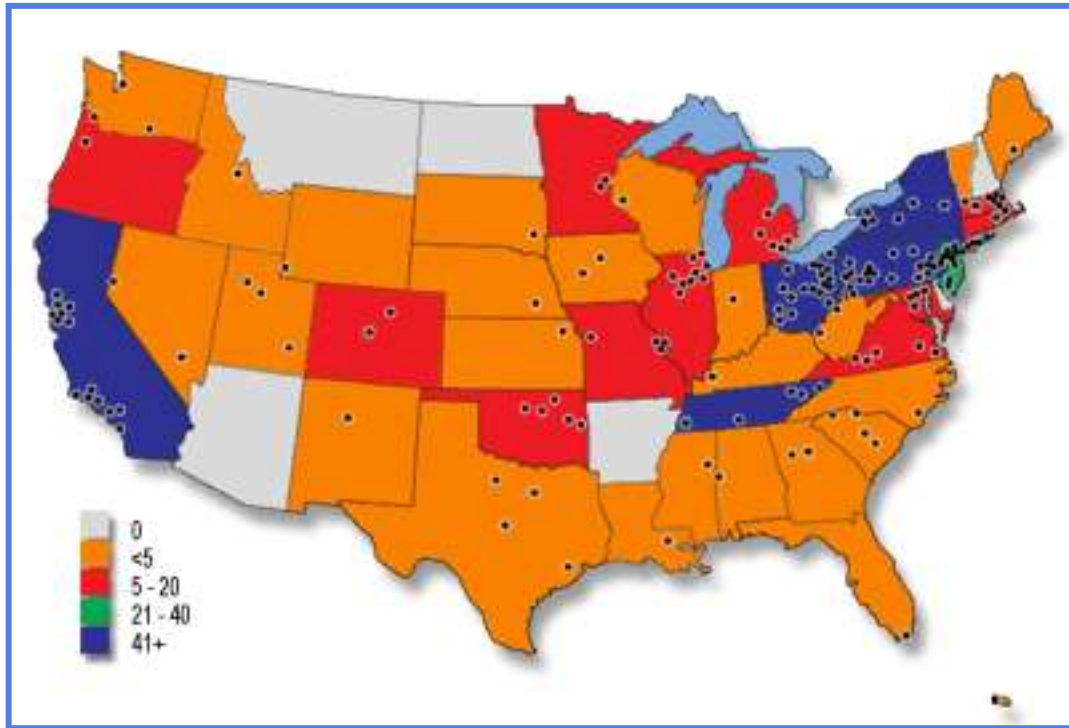
# IV Process for Real Property

- Develop a Graded Approach - IV is not a “one size fits all”!
- Consider the end use of the property (reuse, restricted release, unrestricted release)
- Consider the scope, complexity, and hazard of the site



# IV in the United States

- Required by regulation for Department of Energy (DOE) and Nuclear Regulatory Commission (NRC)

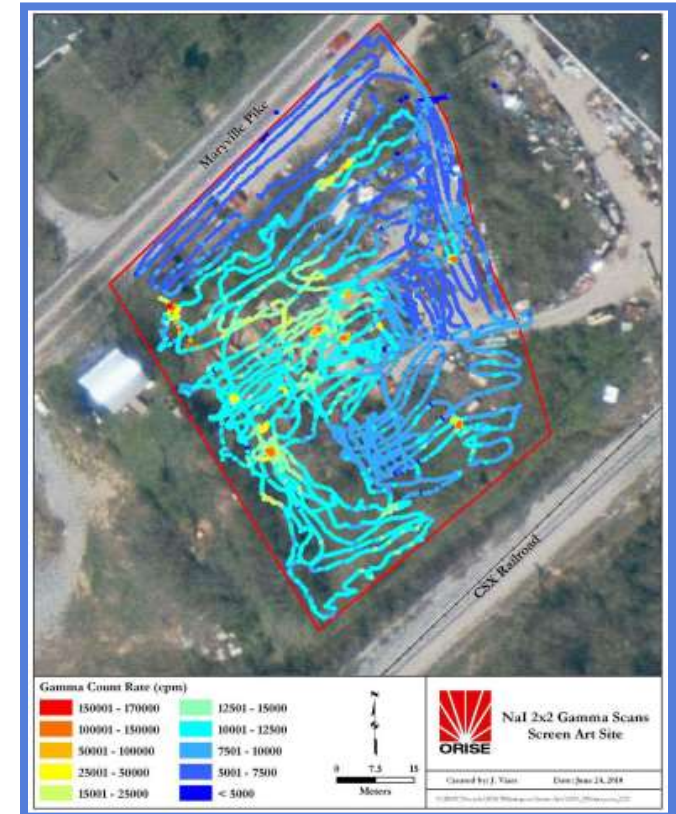


**ORAU/ORISE**  
has performed  
**IV** at over **600**  
sites across the  
country



# Lessons Learned

- ORISE authored two **Final Status Survey Lessons Learned** document for DOE EM-23 (July 2008 and February 2017)
- Major Lessons Learned include:
  - 1) Authorized limits (or other radiological release criteria) need to be:
    - clearly defined
    - developed early
  - 2) Radiological survey plans need to be reviewed prior to implementation
  - 3) Early involvement of the independent verification contractor
    - minimize budget
    - impact schedule
  - 4) **DEFENSIBLE DOCUMENTATION!**



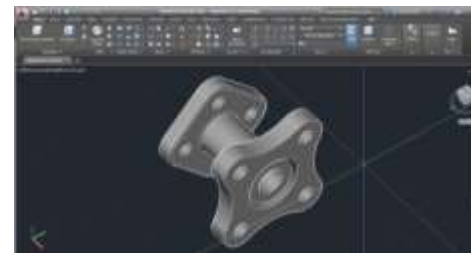
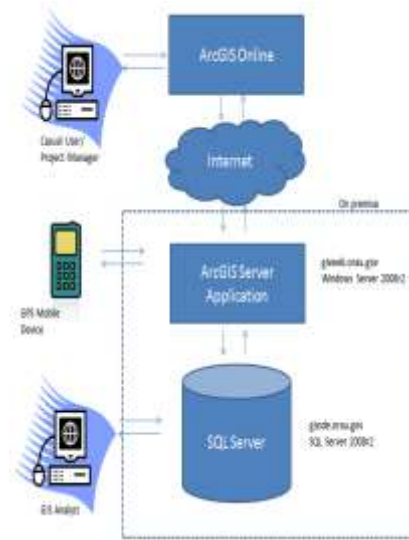
# Lessons Learned (Continued)

- Sites should establish methods for averaging areas exceeding the site release criteria
  - If areas factors are not developed, then the magnitude at which “hot spots” can exceed the site guideline levels is not possible
  - At a minimum, the effect on risk due to identified areas with elevated contamination levels should be evaluated



# Innovations

- 3-D Printing
- Specialized Detectors
- Data Transfer
- Indoor 3D Mapping
- Non-Destructive Assay



# Conclusions

- **Independent Verification Data Benefits Office of Legacy Management**
  - Helps to address future questions about the adequacy of cleanup actions
  - Greatly enhances public credibility in the cleanup process



# Thank You!

