



International Collaboration with Office of Environmental Management



DISTINCTIVE

University Consortium 1st Annual Meeting

April 15 & 16, 2015



The background of the slide features a stylized, wavy American flag. The flag is composed of red, white, and blue stripes and stars, arranged in a flowing, organic shape that frames the central text. The colors are vibrant, with the red appearing as a deep crimson and the blue as a rich navy. The white stars are clearly defined against the blue background.

office of environmental management

part 1

Timeline



1942

**Manhattan
Project**



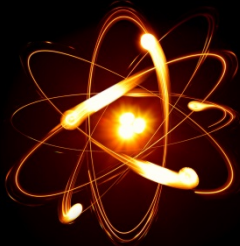
1946

**Atomic Energy
Commission**



1952

Ivy Mike



**Atomic
Energy Act of
1954**

1974

**Nuclear
Regulatory
Commission**



**Energy Research
and Development
Administration**

1977

**Department of
Energy**

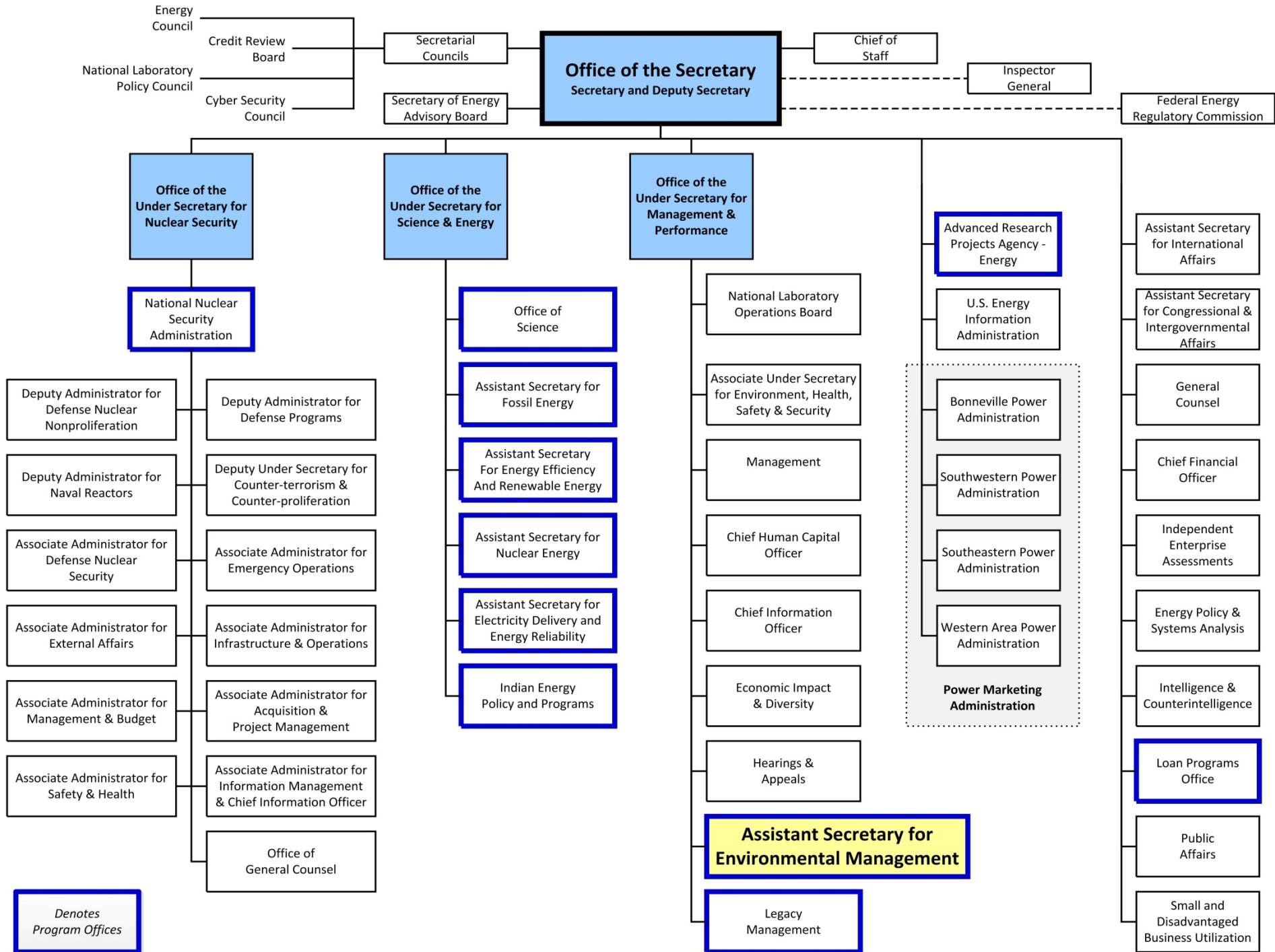


1989

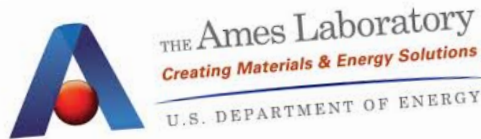
**Environmental
Management**



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DOE National Labs & Tech Centers



DOE National Labs & Tech Centers

❖ Office of Science

- **Ames Laboratory: Ames, IA**
 - Iowa State University
- **Argonne National Laboratory (ANL): Argonne, IL**
 - UChicago Argonne, LLC
- **New Brunswick Laboratory: Argonne, IL (on campus of ANL)**
 - DOE Office of Science
- **Brookhaven National Laboratory: Upton (Long Island), NY**
 - Brookhaven Science Associates
- **Fermi National Accelerator Laboratory: Batavia, IL**
 - Fermi Research Alliance LLC
- **Lawrence Berkeley National Laboratory: University of California at Berkeley, CA**
 - University of California



DOE National Labs & Tech Centers

❖ Office of Science

- **Oak Ridge National Laboratory: Oak Ridge, TN**
 - **University of Tennessee and Battelle Memorial Institute (UT-Battelle)**
- **Oak Ridge Institute for Science and Education: Oak Ridge, TN (on Oak Ridge Reservation)**
 - **Oak Ridge Associated Universities**
- **Pacific Northwest National Laboratory: Hanford Site, Richland, WA**
 - **Battelle Memorial Institute**
- **Princeton Plasma Physics Laboratory: Princeton, NJ**
 - **Princeton University**
- **SLAC National Accelerator Laboratory: Stanford University, Menlo Park, CA**
 - **Stanford University**
- **Thomas Jefferson National Accelerator Facility: Newport News, VA**
 - **Jefferson Science Associates, LLC**



DOE National Labs & Tech Centers

❖ National Nuclear Security Administration

- Lawrence Livermore National Laboratory: Livermore, CA
 - Lawrence Livermore National Security, LLC
- Los Alamos National Laboratory: Los Alamos, NM
 - Los Alamos National Security, LLC
- Sandia National Laboratories: Albuquerque, NM and Livermore, CA
 - Sandia Corporation

❖ Office of Nuclear Energy

- Idaho National Laboratory (INL): Idaho Falls, ID
 - Battelle Energy Alliance
- Radiological and Environmental Sciences Laboratory: Idaho Falls, ID (on campus of INL)
 - DOE Office of Nuclear Energy



DOE National Labs & Tech Centers

- ❖ **Office of Energy Efficiency and Renewable Energy**
 - **National Renewable Energy Laboratory: Golden, CO**
 - Alliance for Sustainable Energy, LLC
- ❖ **Office of Fossil Energy**
 - **National Energy Technology Laboratories: Morgantown, WV; Pittsburgh, PA; Sugar Land, TX; Albany, OR; Anchorage, AK**
 - DOE Office of Fossil Energy
- ❖ **Office of Environmental Management**
 - **Savannah River National Laboratory: Savannah River Site, Aiken, SC**
 - Savannah River Nuclear Solutions, LLC
 - **Savannah River Ecology Laboratory: Savannah River Site, Aiken, SC**
 - University of Georgia



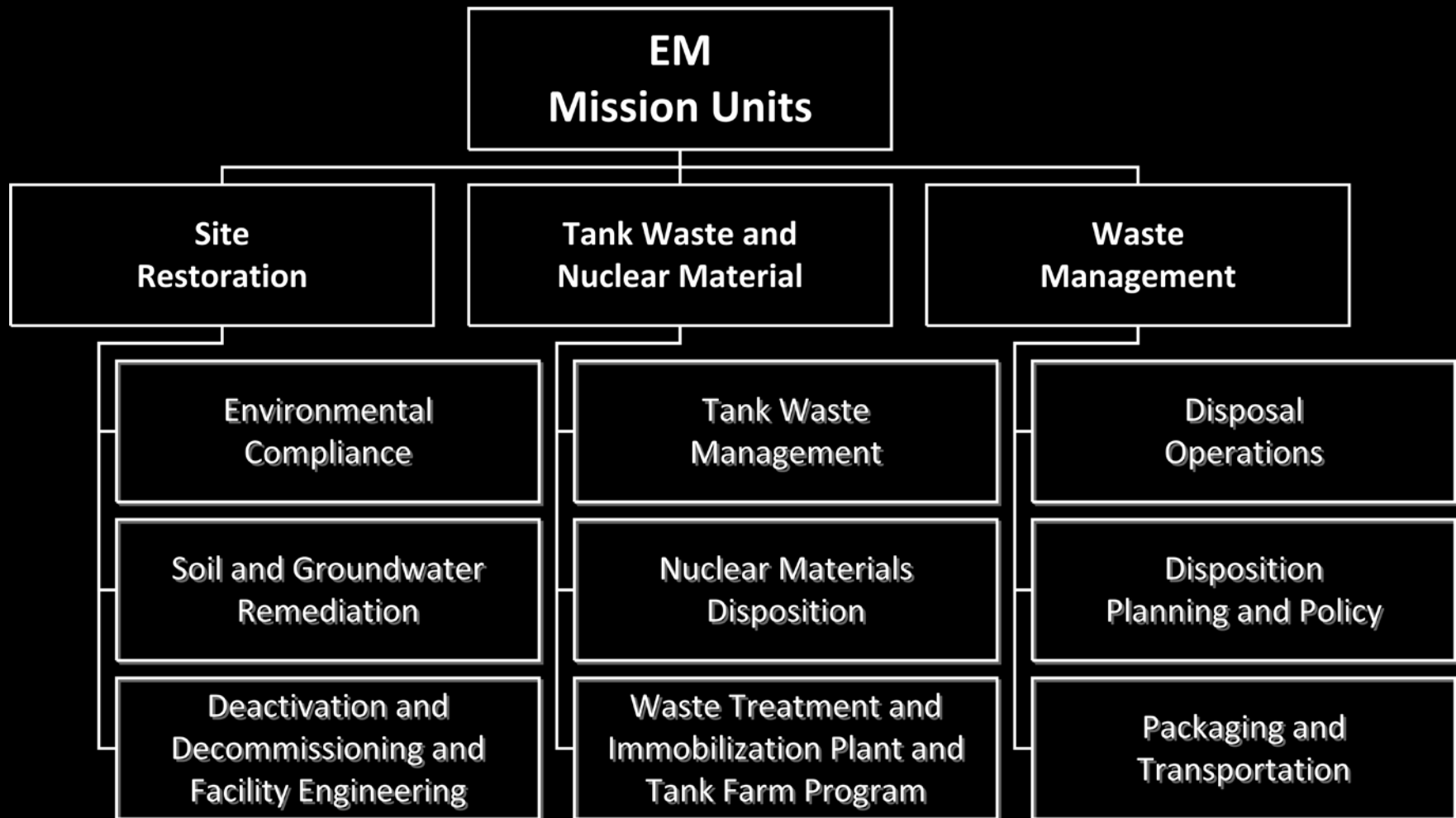
EM Mission



**Safe cleanup of the
environmental legacy
from six decades of
nuclear weapons
production and Federal
Government-sponsored
nuclear energy research**

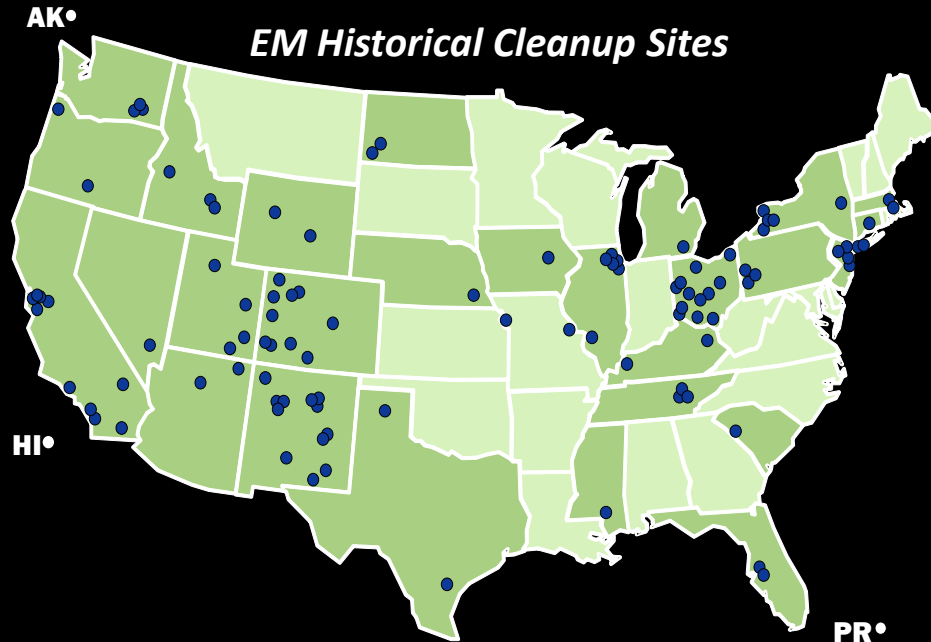


EM Mission Units



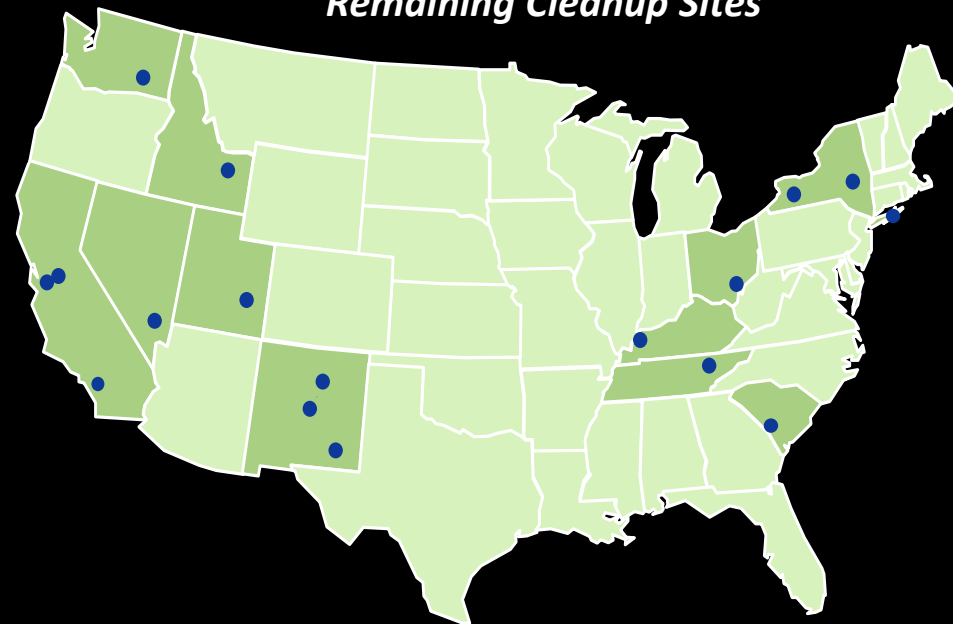
Addressing the Nuclear Legacy

EM Historical Cleanup Sites



Since 1989, EM has completed its cleanup mission at 91 of the 107 major nuclear weapons and nuclear research sites.

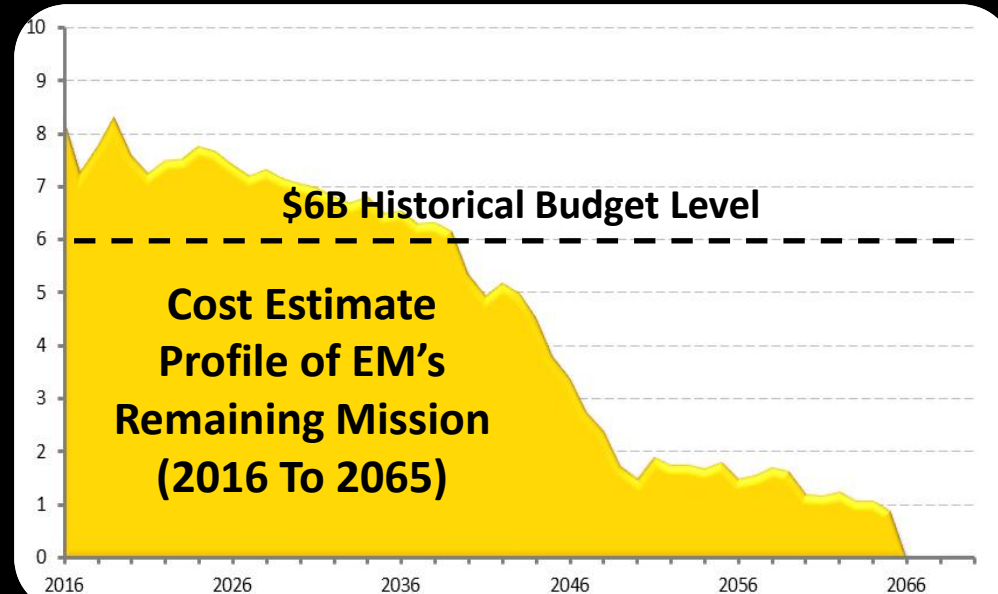
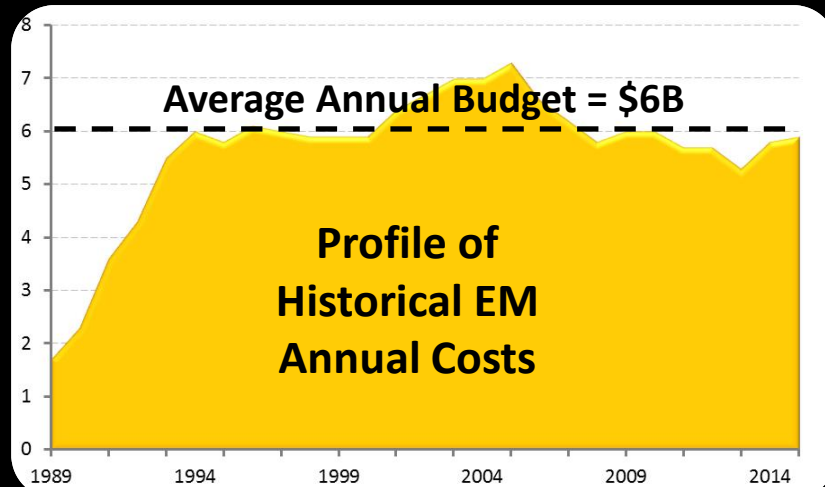
Remaining Cleanup Sites



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12

EM Accomplishment and Challenge



- ❖ \$152 billion spent
- ❖ Completed cleanup at 91 of 107 major sites

- ❖ To-Go Estimate
 - \$235 billion
 - 2065 completion
- ❖ \$28 billion gap



FY 2015 EM Enacted Budget

	\$Million
Radioactive Tank Waste Stabilization and Disposition	\$2,030
Excess Facilities Deactivation and Decommissioning	\$1,110
Transuranic, Low Level, and Mixed-Low Level Waste Disposition	\$890
Special Nuclear Material Consolidation, Processing and Disposition	\$740
Soil and Groundwater Remediation	\$520
Site Infrastructure, Program Support and Management	\$400
Spent Nuclear Fuel Storage, Receipt and Disposition	\$170
	\$5,860



Secretarial Initiative

❖ Secretary Moniz

While the Department's Office of Environmental Management has made significant progress in closing a number of projects, many of the most challenging projects remain and will for decades to come.

❖ Secretary of Energy Advisory Board Task Force on EM Technology Development

➤ Advise the Secretary on:

- Opportunities and barriers for science and technology development for cleanup;
- Means to implement a program to develop such technologies; and
- Funding of the program.



Task Force Recommendation

❖ University engagement

- Pipeline of new ideas
- Access to advances in engineering and science
- Cadre of educated professionals for the EM program in the decades ahead



Science

A vibrant, abstract image representing science, featuring a glowing orange and yellow spiral galaxy or nebula against a dark blue background with faint grid lines and other celestial structures.



Technology

An abstract image representing technology, showing a blue, crystalline or geometric structure with glowing points and lines, suggesting a digital or networked environment.



Engineering

An abstract image representing engineering, featuring a blue, metallic-looking structure with gears and mechanical components, overlaid with binary code (0s and 1s).



Mathematics

An abstract image representing mathematics, showing a dark background with glowing yellow and orange mathematical formulas and symbols, including $\Gamma(x)$, $\int e^{-x} x^{n-1} dx$, $\sum_{i=1}^n (x_i - \langle x \rangle)^2$, and $P_2(x)$.



Current Engagements

- ❖ Continue current university collaborations
- ❖ Seek opportunities for active participation on UK initiatives and programs

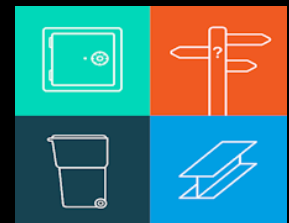


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A university consortium funded by the
Research Councils UK Energy programme



The American flag is visible on the left side of the slide, partially obscured by a large black wavy shape. It shows the stars and stripes in detail.

statement of intent

part 2

Trilateral Agreement

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S

Statement of Intent between

UK National Decommissioning Authority,

A

UK National Nuclear Laboratory, and

US Department of Energy



Who are the Signatories?

- ❖ UK Nuclear Decommissioning Authority
- ❖ UK National Nuclear Laboratory
- ❖ US Department of Energy offices
 - Environmental Management
 - Nuclear Energy



What is the Statement of Intent?

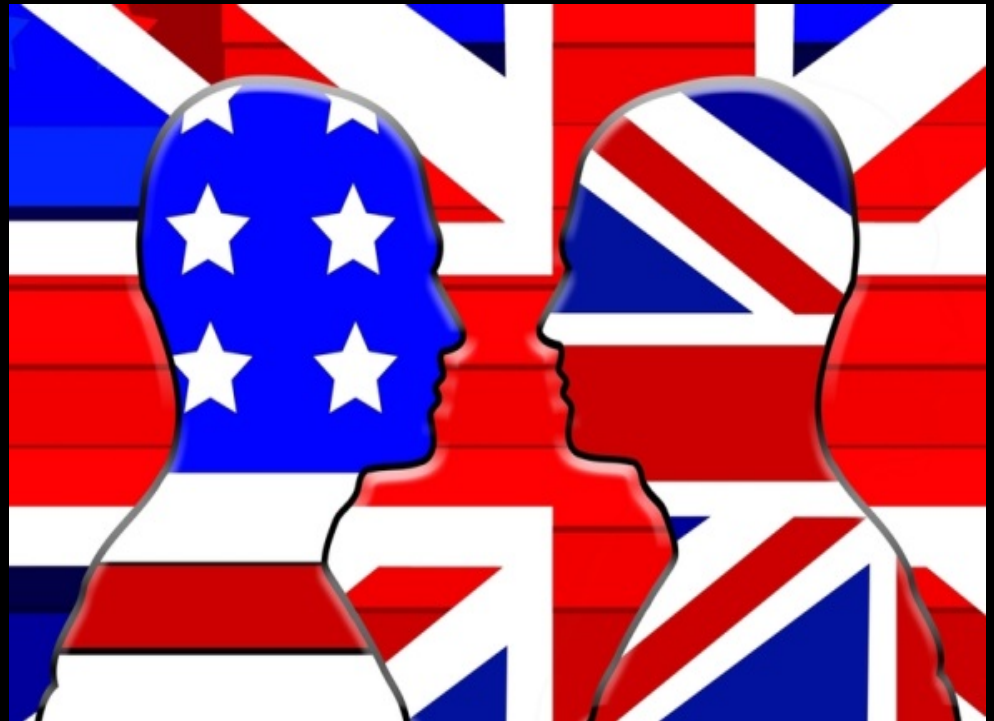
- ❖ **Trilateral agreement for facilitating the exchange of information, technology and personnel in areas related to nuclear cleanup as well as nuclear waste, materials, and fuels management**
 - **2007: DOE EM and UK NDA agreed**
 - **2012: Renewed, DOE NE signed**
 - **2014: UK NNL signed**



What is the Statement of Intent?

❖ It is a RELATIONSHIP

- Collaboration
- Engagement
- Cooperation
- Partnership
- Sharing
- Exchange



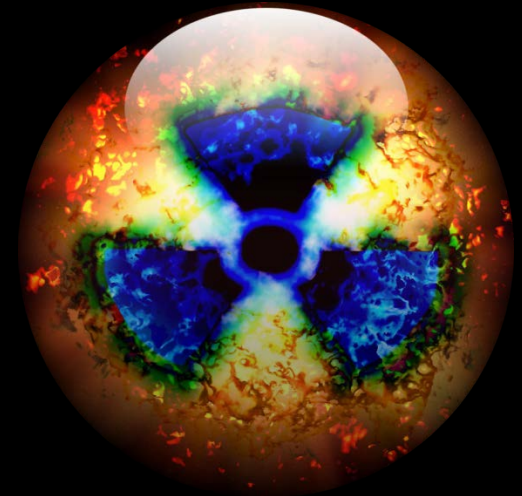
Why do we need the SOI?

- ❖ **Mission similarities**
 - **Scope and scale of nuclear work**
 - **Technical complexities**
 - **Uncertainties and risks**
- ❖ **Governmental liability**
- ❖ **Taxpayer stewardship**
- ❖ **Global “market”**
- ❖ **Generational challenge**



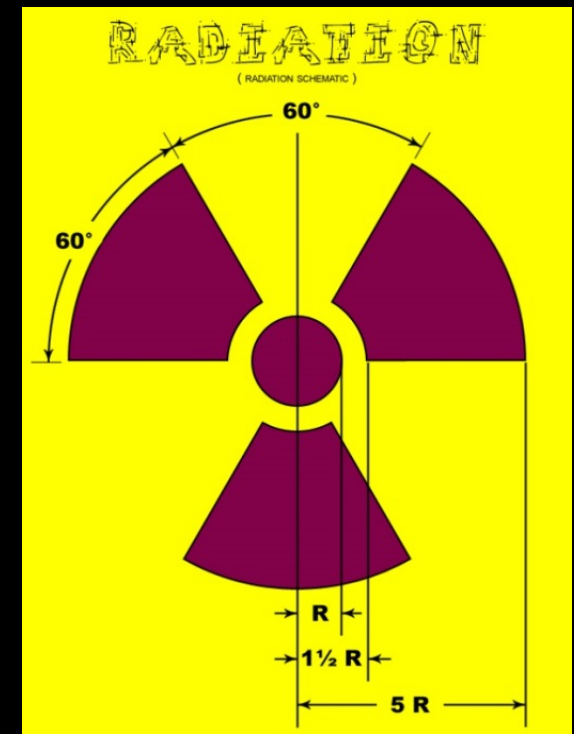
Early Years of Collaboration

- ❖ **Waste management and stabilization**
 - Glass chemistry and formulation
- ❖ **Decommissioning**
 - Decontamination technologies
- ❖ **Spent fuel management**
 - Aging facilities management
- ❖ **Contract management**
 - Nuclear supply chain



Expanding our Collaboration

- ❖ Consult for engineering design of Hanford Waste Treatment and Immobilization Plant
- ❖ Start-up and commissioning
- ❖ New collaborations and engagements
 - DOE NE and UK Department of Energy and Climate Change
 - Nuclear Innovation Research Advisory Board



Expanding our Collaboration

❖ Knowledge and technology transfer

- 3D sonar for tank sludge mapping
- Decontamination “fogging”
- Robotic snake arm
- Destruction of organics in waste
- Robotics tooling “catalog”
- Power Fluidics™



“Future” Collaborations

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Summary

- ❖ **US-UK relationship continues to grow**
 - **Leadership remains committed**
 - **Depth and breadth of knowledge and technology exchanges are increasing**
 - **Engaged in experiential learning**
 - **Interactions among organizations are expanding**
 - **Investing in the next nuclear generation**
- ❖ **SOI remains an effective instrument for international cooperation and collaboration**





Summary

- ❖ **University engagement is a mission imperative**
- ❖ **DOE – EM will actively support the UK DISTINCTIVE University Consortium**

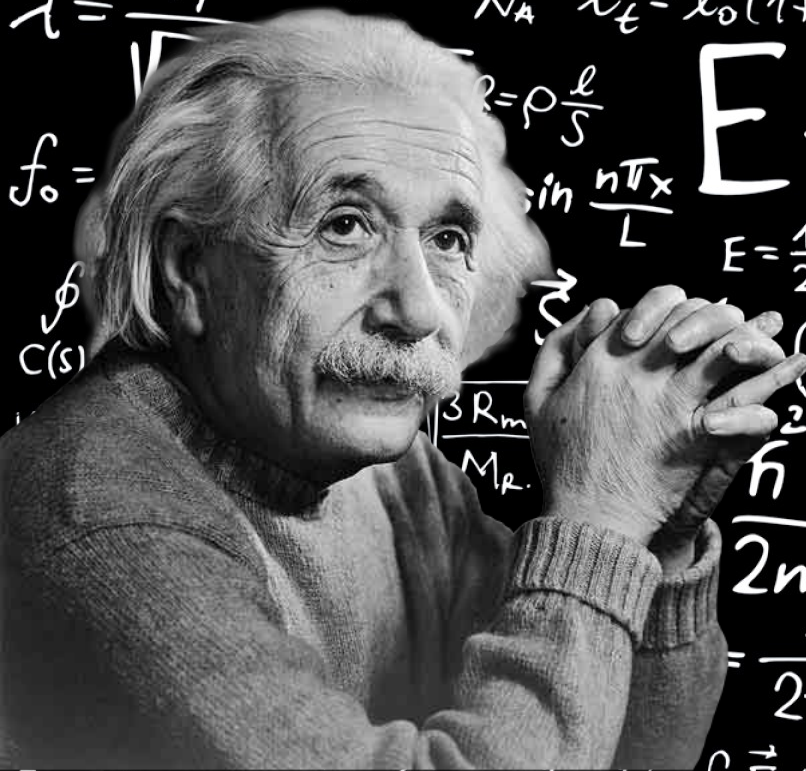


Final Thought

**We can't solve problems by using
the same kind of thinking we used
when we created them.**

Albert Einstein

Theoretical Physicist



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