National Nuclear Security Administration

Presentation to

Workshop on Risk Assessment
and Safety Decision-Making Under Uncertainly
By

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NNSA

Overview

Major Responsibilities

NNSA plays critical roles in the national security community:

- Maintain a safe, secure, and reliable nuclear weapons stockpile to help ensure the security of the United States and its allies, deter aggression, and support international stability – *Defense Programs*
- Detect, prevent, and reverse the proliferation of weapons of mass destruction, and promote international nuclear safety – *Defense Nuclear Nonproliferation*
- Provide the U.S. Navy with safe, militarily effective nuclear propulsion systems, and ensure their continued safe and reliable operation – *Naval Reactors*
- Administer and direct the programs of the National nuclear/radiological emergency response capability to ensure availability and viability to respond to nuclear and radiological emergencies within the United States and abroad – *Emergency Operations*

All assets in NNSA support U.S. leadership in science and technology

NNSA Mission Areas

Defense Programs

Maintain a safe, secure, and reliable nuclear weapons stockpile to help ensure the security of the United States and its allies, deter aggression, and support international stability.

A National Ignition Facility technician examines a damage inspection instrument used to assess the optics in the target chamber.

Defense Nuclear Nonproliferation

Detect, prevent, and reverse the proliferation of weapons of mass destruction, and promote international nuclear safety.

A container with naturally occurring radioactivity processed through a radiation portal monitor as part of NNSA's Second Line of Defense Program.

Naval Reactors

Provide the U.S. Navy with safe, militarily effective nuclear propulsion systems, and ensure their continued safe and reliable operation.

Nuclear-powered submarine, VIRGINIA, returning to port following her highly successful sea trials.

Emergency Operations

Administer and direct the programs of the National nuclear/radiological emergency response capability to ensure availability and viability to respond to nuclear and radiological emergencies within the United States and abroad.

Dep Energy Sec Daniel Poneman (center) reviews Leading Nuclear Counter-terrorism Assets. This equipment, used at the G-20 Summit, is similar to NNSA's portable gamma/neutron detector.

Nuclear Security Enterprise

National Laboratories and Test Site

Sandia Nat'l Laboratories
NM and CA Sites
Systems engineering, neutron generators, and non-nuclear component design
Staff: 83 federal; 3,615 Contractor; 458 federal service center

Nevada Test Site
Nevada
Experimental site and "subcritical" nuclear material tests
Staff: 90 federal; 1,544 Contractor

Los Alamos Nat'l Laboratory
Los Alamos, New Mexico
Nuclear design lab and Pu Sustainment (B61, W76, W78, W88)
Staff: 109 federal; 5,135 Contractor

Lawrence Livermore Nat'l Laboratory
Livermore, California
Nuclear design lab (W80, W87, B83)
Staff: 93 federal; 3,922 Contractor

Production Complex

Pantex Plant
Amarillo, Texas
Weapons assembly/disassembly
Staff: 77 federal; 3,191 Contractor

Kansas City Plant
Kansas City, Missouri
Nonnuclear manufacturing/ Procurement
Staff: 39 federal; 1,666 Contractor

Y-12 National Security Complex
Oak Ridge, Tennessee
Uranium operations
Staff: 81 federal; 3,574 Contractor

Savannah River Site
Aiken, South Carolina
Tritium operations
Staff: 36 federal; 1,330 Contractor

Note: Staff numbers are based on FY 2009 actual full time equivalents. Contractors listed are those employed for only weapons activities.

Defense Programs Contributions

- **Provides a safe, secure, and effective nuclear arsenal for the United States**
  - **Deliver second-to-none nuclear stockpile**
  - **Continue certification and production activities**
  - **without underground nuclear testing,**
  - **without new weapons military capabilities,**
  - **without producing new fissile material**
- **Lead the research and development of future nuclear weapons safety, security and reliability features**
  - **Develop scientific, engineering, and technical capabilities needed to support a broad range of national and nuclear security challenges**
- **Safely transport nuclear weapons, weapons components, and special nuclear material**
- **Furnish the nation with a modern, sustainable physical infrastructure for the nuclear security enterprise**

SAFE | SECURE | EFFECTIVE

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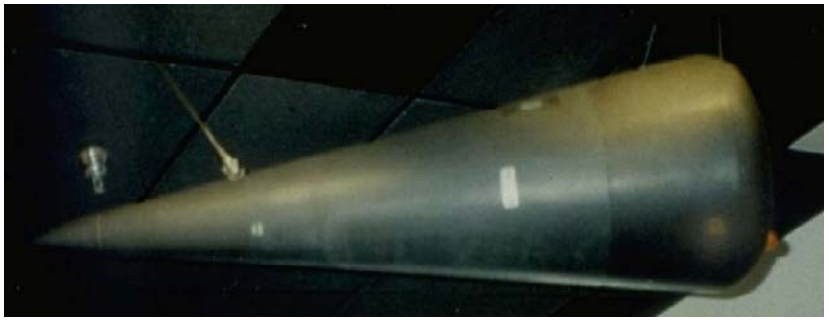
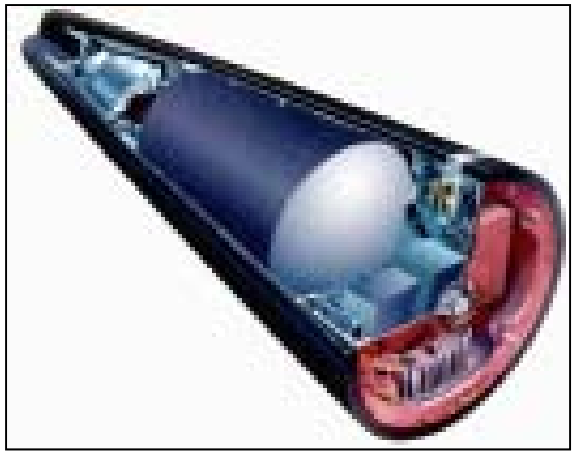
Life Extension Programs Ongoing or Pending for Three Critical Weapons



W78: Requirements Study Initiated as Prerequisite to Phase 6.1 Study in August 2010

B61: Life Extension Program Phase 6.2/6.2A Study Initiated in 2008



W76: First Production Unit in September 2008

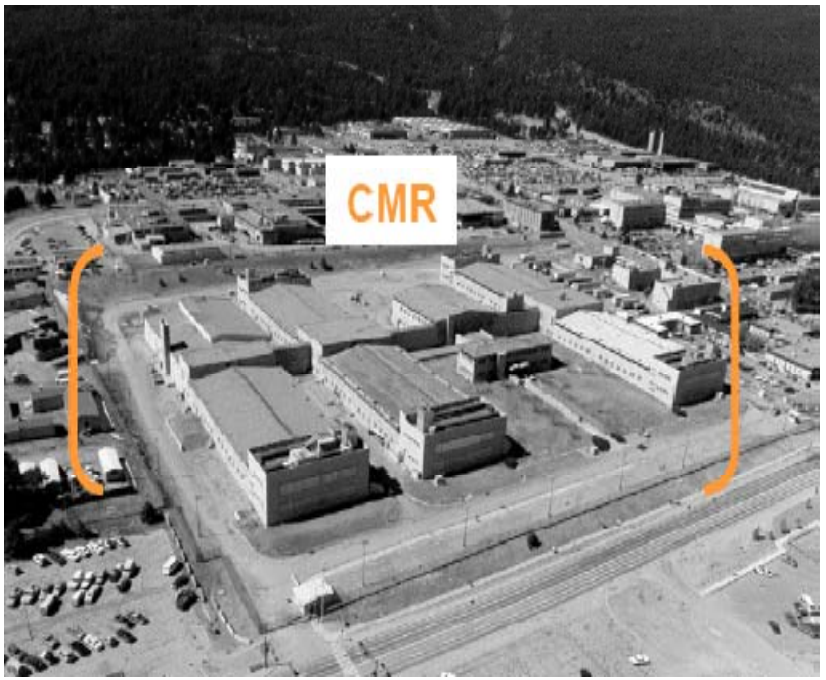
NNSA

Responsibilities and Challenges

NNSA Safety Responsibilities

- **Line Organization Responsible for**
  - **Nuclear**
  - **High Hazard**
  - **Industrial**
  - **Packaging and Transportation**
- **Special Considerations**
  - **Nuclear Explosive Safety**
  - **Secure Transportation**
- **Design and Construction of Facilities**
  - **Pu, U, and T-3**
  - **High Energy Density Physics**

CMR



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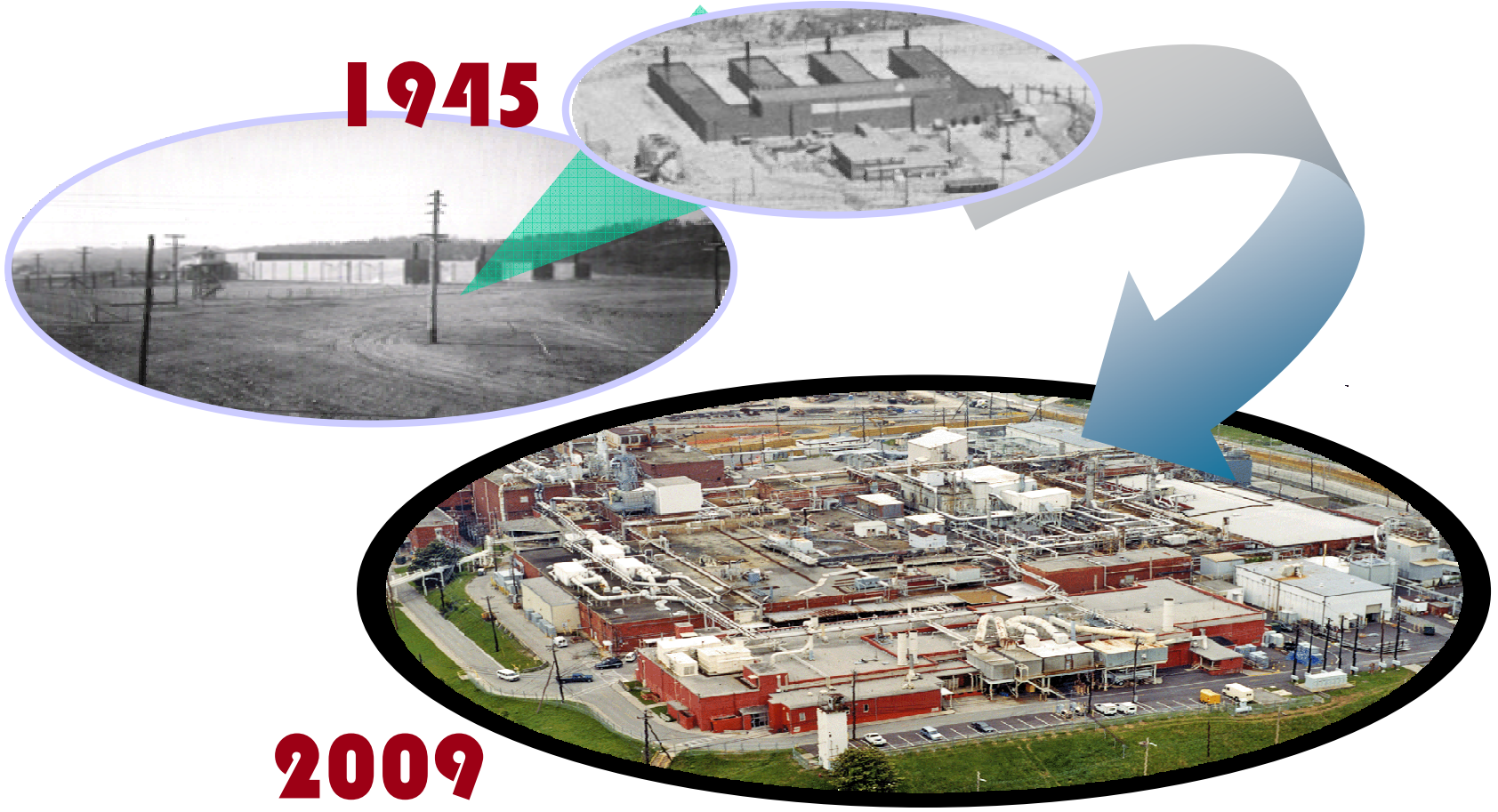
9212—Then and Now



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Major Physical Infrastructure Projects

Plutonium Facility-4 (PF-4): Recapitalization will enable pit manufacturing capacity up to 80 pits per year by 2022

Chemistry Metallurgy Research Replacement-Nuclear Facility (CMRR-NF): Construction completed by 2020

Uranium Processing Facility (UPF): Up to 80 secondaries per year by 2022, construction completed by 2020

Kansas City Responsive Infrastructure, Manufacturing and Sourcing (KCRIMS): New facility supports non-nuclear production, active weapons programs, dismantlement programs and all life extension programs, construction completed by 2012

High Explosive (HE) Pressing Facility: New facility ensures sustained responsiveness for all HE mission-related work with a production capacity from 300 up to 500 hemispheres per year and construction completed by 2017

Policy & Process Challenges

- **Gaining common understanding of application and limitations of risk assessment for Authorization Basis**
  - **risk goal / acceptable risk**
    - **Likelihood goal**
    - **Consequence goal**
    - **Risk goal**
  - **Uncertainty & conservatism**
  - **Design basis vs. beyond design basis**
  - **Discrete / individual vs. system / holistic**

- **Gaining common understanding of application and limitations of risk assessment for decision-making**
  - **Risk / benefit**
  - **Safety "opportunity cost"**

NNSA Role for Risk Assessment

- **Design of New Facilities**
- **Operation of Aging Facilities**
- **Prioritization of Enterprise Recapitalization Efforts**

- **Backup**

Defense Programs Organization