Defense Programs Update

Marvin Adams

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Our core mission is easy to state ...

Deliver

safe, secure, reliable warheads for an effective nuclear deterrent

... and challenging to accomplish
We take care of today’s warheads

- **All life-cycle activities** to provide a safe, secure, and reliable nuclear weapon stockpile.
- **Strategic planning** for sustainment of the nuclear weapons stockpile, production infrastructure, and nuclear materials availability, storage, and transportation.
- **Surveillance** program for nuclear weapons.
- **Nuclear weapons surety** program including safety, security, use control, and weapons quality.
The U.S. is updating warheads and delivery systems

<table>
<thead>
<tr>
<th>CURRENT SYSTEMS</th>
<th>MODERNIZATION</th>
<th>FUTURE SYSTEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air-Based</strong></td>
<td><strong>B61-12 LEP</strong></td>
<td><strong>Air-Based</strong></td>
</tr>
<tr>
<td>B-52H</td>
<td>B61-3/4</td>
<td>B-52H</td>
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<tr>
<td>ALCM W80-1</td>
<td></td>
<td>B-21</td>
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<tr>
<td>B-2</td>
<td></td>
<td>F-35A DCA</td>
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<td>F-15 DCA</td>
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<td>W80-4 LEP</td>
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<tr>
<td><strong>Land-Based</strong></td>
<td><strong>W87-1 Mod</strong></td>
<td><strong>Land-Based</strong></td>
</tr>
<tr>
<td>Minuteman III</td>
<td>W87-0</td>
<td>Sentinel</td>
</tr>
<tr>
<td>W87-0</td>
<td>W78</td>
<td>W87-0</td>
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<tr>
<td><strong>Sea-Based</strong></td>
<td><strong>W88 Alt 370</strong></td>
<td><strong>Sea-Based</strong></td>
</tr>
<tr>
<td>Ohio-class SSBN</td>
<td>W76-0/1/2</td>
<td>Columbia-class SSBN</td>
</tr>
<tr>
<td>Trident D-5 LE1</td>
<td>W88</td>
<td>Trident D-5 LE2</td>
</tr>
<tr>
<td>W87-0/1/2</td>
<td>W88</td>
<td>W76-1/2</td>
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<tr>
<td><strong>Sea-Based</strong></td>
<td><strong>W93 Program</strong></td>
<td><strong>W88</strong></td>
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<td></td>
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<td>W93</td>
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W88 Alt 370

W93 Program
We are executing five warhead programs

- Types of modernization activities:
  - Life Extension Programs (LEPs)
  - Alterations (Alts)
  - Modifications (Mods)
  - Weapon Acquisition Programs

- Modernization efforts address:
  - Aging
  - Unavailability of replacement parts
  - Integration with DoD’s modernized nuclear weapons delivery systems

Must meet DoD requirements while enhancing safety and security

- W88 Alt 370 FPU July 2021
- B61-12 LEP FPU November 2021
- W80-4 LEP FPU FY 2027
- W87-1 FPU early 2030s
- W93 FPU mid 2030s
Our enterprise is distributed across the U.S.

**LLNL**
- **Weapons Design and Engineering**
  - Hydrotesting
  - Major environmental testing
- **Research & Development**
  - Plutonium R&D
  - Tritium R&D
  - High Explosives R&D

**NNSS**
- **Nuclear Testing**
  - Underground test readiness
  - High explosives testing
  - Hydrotesting

**LANL**
- **Weapons Production**
  - Plutonium pit production
  - Non-nuclear components production
- **Weapons Design and Engineering**
  - Hydrotesting
  - Major environmental testing
- **Research & Development**
  - Plutonium R&D
  - High explosives R&D
  - Tritium R&D

**SNL**
- **Weapons Production**
  - Neutron generator design/production
- **Weapons Design and Engineering**
  - Non-nuclear components
  - Flight testing at Tonopah Test Range
  - Major environmental testing
  - Rad-hard microelectronics
- **Research & Development**
  - High explosives R&D

**Pantex**
- **Weapons Production**
  - Weapons assembly & disassembly
  - High explosives production
- **Research & Development**
  - High explosives R&D

**KCNSC**
- **Weapons Production**
  - Nonnuclear component manufacturing/procurement

**Y-12 NSC**
- **Weapons Production**
  - Uranium components
  - Canned sub-assembly production
- **Weapons Materials**
  - Lithium Processing

**SRS**
- **Weapons Production**
  - (Future) Plutonium pit production
  - Tritium reservoir change-out
- **Weapons Materials**
  - TPBAR extraction
- **Research & Development**
  - Tritium R&D
We are rebuilding infrastructure ...

<table>
<thead>
<tr>
<th>Project</th>
<th>Site</th>
<th>status</th>
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<tbody>
<tr>
<td>Estimated cost &gt; $10 B</td>
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<tr>
<td>Savannah River Plutonium Processing Facility (SRPPF)</td>
<td>SRS</td>
<td>design</td>
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<tr>
<td>Estimated cost $5-10 B</td>
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<tr>
<td>Uranium Processing Facility (UPF)</td>
<td>Y-12</td>
<td>execution (construction)</td>
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<tr>
<td>Estimated cost $1-5 B</td>
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<tr>
<td>Los Alamos Plutonium Pit Production Project (LAP4)</td>
<td>LANL</td>
<td>execution &amp; design</td>
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<tr>
<td>Chemistry &amp; Metallurgy Research Replacement (CMRR)</td>
<td>LANL</td>
<td>execution &amp; design</td>
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<td>Advanced Sources and Detectors (ASD)</td>
<td>NNSS</td>
<td>execution</td>
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<tr>
<td>Lithium Processing Facility (LPF)</td>
<td>Y-12</td>
<td>design</td>
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<tr>
<td>Project</td>
<td>Site</td>
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<tr>
<td>Estimated cost $0.5-1 B</td>
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<tr>
<td>U1a Complex Enhancements Project (UCEP) Subproject 020</td>
<td>NNSS</td>
<td>execution</td>
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<td>High Explosive Synthesis, Formulation, and Production (HESFP)</td>
<td>PTX</td>
<td>design</td>
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<tr>
<td>Tritium Finishing Facility (TFF)</td>
<td>SRS</td>
<td>design</td>
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<tr>
<td>Estimated cost $100-500 M</td>
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<td>Calciner (CALP)</td>
<td>Y-12</td>
<td>execution</td>
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<tr>
<td>West End Protected Area Reduction (WEPAR)</td>
<td>Y-12</td>
<td>execution</td>
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<tr>
<td>High Explosive Science &amp; Engineering (HESE)</td>
<td>PTX</td>
<td>execution</td>
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<tr>
<td>Transuranic Liquid Waste (TLW)</td>
<td>LANL</td>
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<td>TA-55 Reinvestment Project Phase 3 (TRP III)</td>
<td>LANL</td>
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<td>Electrorefining (ER)</td>
<td>Y-12</td>
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<td>Electrical Power Capacity Upgrade (EPCU)</td>
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<td>Power Sources Capability (PSC)</td>
<td>Sandia</td>
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<tr>
<td>Direct Chip Melt (DCM) Bottom Loading Furnace (BLF)</td>
<td>Y-12</td>
<td>design</td>
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We execute secure transportation

Secure Transportation Asset: enabled by the core components of the STA security concept of specialized vehicles, secure trailers, specially trained Federal Agents, and leading-edge communication systems

- Provide safe and secure transport of nuclear weapons, weapon components, and special nuclear material throughout nuclear security enterprise
- Defend, recapture, and recover nuclear materials in case of an attack
- Ensure convoy safety and security through specialized vehicles, secure trailers, specially trained Federal agents, and leading-edge communication systems
We use experiments, tests, and/or computations for everything we do.

Experimental Sciences
Delivers experimental tools and data to assess, certify, life extend, and develop future options for the Nuclear Explosive Package

Advanced Simulation & Computing and Institutional R&D
Provides modeling and computer simulation capabilities required for stockpile stewardship

Engineering & Technology Maturation
Underpins aging assessments, survivability, weapons environment testing, and stockpile responsiveness throughout the weapon lifecycle
I look forward to questions

Questions?