DOE Project Management
The Year in Review

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Director, Office of Project Management
Oversight and Assessments
Agenda – Hitting the Wave Tops

• Project Management Order (413) Update
• Energy Systems Acquisition Advisory Board (ESAAB) and Major System Project Highlights
• Project Portfolio Status: Then and Now
• Project Management Success Metrics Update
• Earned Value Management System (EVMS) and Project Assessment & Reporting System (PARS IIe) Developments
• GAO High-Risk List Update
• PM Website Status
• Closing Thoughts
Critical Decision (CD) Milestones

Start Project Peer Reviews

Operating Funds

External Independent Review (EIR) to Validate Scope, Cost, Schedule >$100M
External Review for Projects >$750M

Design Funds

Construction Funds

Operating Funds

Initiation

Definition

Execution

Closeout

Total Project Cost (TPC)

Critical Decisions (“CDs”)

- CD-0: Approve Mission Need
- CD-1: Approve Alternative Selection and Cost Range
- CD-2: Approve Performance Baseline (PB)
- CD-3: Approve Start of Construction or Execution
- CD-4: Approve Start of Operations or Project Completion

Projects Report Earned Value ≥ $20M
Project Assessment and Reporting System (PARS IIe) for Projects ≥ $10M

Deputy Secretary is the Chief Executive for Project Management, overseeing Major System Projects (MSP) – those > $750M
Order 413 Update – Key Changes (Updated May 12, 2016)

- Only codified Secretarial policies
- Monetary threshold change: From—$50M → To—$10M
- Strengthened the Energy Systems Acquisition Advisory Board (ESAAB) – chaired by Deputy Secretary
- Institutionalized the Project Management Risk Committee (PMRC)
- Improved upfront planning: design maturity and technology readiness (TRL-7 at CD-2)
- Implemented best practices: independent cost estimates, alternatives analysis, and integrated master scheduling
- Improved Project Peer Review (PPR) processes
- Transferred Earned Value Management System (EVMS) compliance and surveillance reviews to contractors, projects <$100M
### ESAAB’s – Recent Deputy Secretary Critical Decisions
(Authorized Over $40 Billion – This Past Year +)

<table>
<thead>
<tr>
<th>No.</th>
<th>ESAAB Mtg Date</th>
<th>Project Title</th>
<th>Critical Decision</th>
<th>Cost*</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>September 11, 2015</td>
<td>Strategic Petroleum Reserve Life Extension Phase 2 (SPR-LE2)</td>
<td>CD-0</td>
<td>$1.4B</td>
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<td>2</td>
<td>October 5, 2015</td>
<td>Plutonium Modular Approach (PMA)</td>
<td>CD-0</td>
<td>$3.0B</td>
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<td>3</td>
<td>December 21, 2015</td>
<td>Matter-Radiation Interactions in Extremes (MaRIE)</td>
<td>CD-0</td>
<td>$3.7B</td>
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<td>4</td>
<td>July 28, 2016</td>
<td>Exascale Computing Project (ECP)</td>
<td>CD-0</td>
<td>$5.1B</td>
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<tr>
<td>5</td>
<td>August 11, 2016</td>
<td>Strategic Petroleum Reserve Marine Terminal Enhancements (SPR-MTE)</td>
<td>CD-0</td>
<td>$1.5B</td>
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<tr>
<td>6</td>
<td>September 26, 2016</td>
<td>Waste Treatment and Immobilization Plant (WTP) – ORP</td>
<td>BCP</td>
<td>$16.8B</td>
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</table>

* Pre-CD-2 costs reflect the upper end of the cost range.
<table>
<thead>
<tr>
<th>No.</th>
<th>ESAAB Mtg Date</th>
<th>Project Title</th>
<th>Critical Decision</th>
<th>Cost*</th>
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<tbody>
<tr>
<td>7</td>
<td>October 27, 2016</td>
<td>River Corridor Closure Project (RCCP) – Richland</td>
<td>BCP</td>
<td>$1.85B</td>
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<td>8</td>
<td>November 7, 2016</td>
<td>Trusted Microsystems Capability (TMC)</td>
<td>CD-0</td>
<td>$3.7B</td>
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<td>9</td>
<td>November 16, 2016</td>
<td>Exascale Computing Project (ECP)</td>
<td>CD-1/3A</td>
<td>$5.7B</td>
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<td>10</td>
<td>November 28, 2016</td>
<td>Strategic Petroleum Reserve Life Extension Phase 2 (SPR-LE2) – TX and LA</td>
<td>CD-1</td>
<td>$1.4B</td>
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<tr>
<td>11</td>
<td>December 13, 2016</td>
<td>Domestic Uranium Enrichment (DUE)</td>
<td>CD-0</td>
<td>$14.1B</td>
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<tr>
<td>12</td>
<td>January 12, 2017</td>
<td>International Thermonuclear Experimental Reactor (ITER) First Plasma – France</td>
<td>CD-1R (CD-2/3)</td>
<td>$6.5B ($2.5B)</td>
</tr>
</tbody>
</table>

GRAND TOTAL $41.5B

* Pre-CD-2 costs reflect the upper end of the cost range.  ** Including two QPR’s, Quarterly Project Reviews.
Strategic Petroleum Reserve: (2) Projects

(1) Life Extension, Phase 2 (SPR-LE2) Project [Bryan Mound, Big Hill, West Hackberry, and Bayou Choctaw]
   • Critical Decision (CD)-1, $750M-$1.4B, FY22-FY24

(2) Marine Terminal Enhancements (MTE) Project [Seaway, Texoma, and Capline]
   • Critical Decision (CD)-0, $500M-$1.5B, FY23-FY25
Storage Cavern

Drawdown

Water In

Oil Out

Oil Out

Oil

Brine

Salt Dome
Relational Comparison

SALT DOME

Typical SPR Cavern

Willis Tower
1,451'

Washington Monument
555'

Mercedes-Benz Superdome
273'

petroleum

limestone

anhydrite

sulfur

gypsum

2550'

2260'
Strategic Petroleum Reserve: (2) Projects

(1) Life Extension, Phase 2 (SPR-LE2) Project [Bryan Mound, Big Hill, West Hackberry, and Bayou Choctaw]
- Critical Decision (CD)-1, $750M-$1.4B, FY22-FY24

(2) Marine Terminal Enhancements (MTE) Project [Seaway, Texoma, and Capline]
- Critical Decision (CD)-0, $500M-$1.5B, FY23-FY25
Transistors → Printed on → Wafers

- NNSA requires a trusted supply of strategic radiation-hardened advanced microsystems
- Required migration from 8” to 12” wafer equipment does not fit in current MESA Silicon Fabrication Facility
- U.S. nuclear weapons stockpile relies upon the use of radiation-hardened electronics
- Fragility of current infrastructure has increased risk to current production and enduring stockpiles
Domestic Uranium Enrichment (DUE)
(Make Tritium)

Critical Decision (CD)-0, $3.3B-$14.1B, FY27-FY39

High End Cost Range
- Centrus’ AC100 “Large” centrifuge technology successfully tested in demonstration cascade at Portsmouth Site

Low End Cost Range
- “Small” centrifuge design being developed by ORNL
- Goal is to design a lower-cost option, closer to industry standard

Centrus AC100

ORNL “Small” Centrifuge
ITER is the world’s “burning plasma” experiment:

- Demonstrate the technical viability of generating energy through fusion
- Today: 10 MW, 1 sec, gain < 1
- ITER: 500 MW, > 400 sec, gain ≥ 10;
  3000 seconds, gain = 5
- Major contributions from U.S. industry
- U.S. contributing (12) components, to include: magnet systems, cooling water systems, and vacuum pumping and fueling systems
- “First Plasma” in 2025; burning fusion plasmas in 2030’s

An international collaboration:

- 7 partners, 50% of world’s population
ITER – In Five Minutes
### Major System Capital Asset Projects

**Post CD-2 (Above the Line)**

1. EM, Waste Treatment & Immobilization Plant (WTP) – Hanford, WA ($16.813B)
2. EM, Salt Waste Processing Facility (SWPF) – Savannah River, SC ($2.322B)
3. EM, River Corridor Closure Project (RCCP) – Richland, WA ($1.85B)
4. NA, Mixed Oxide Fuel Fabrication Facility (MOX) – Savannah River, SC ($4.857B)

**CD-2 (Pre)**

5. NA, Uranium Processing Facility (UPF) – Oak Ridge (CD-1 Range: $4.2B - $6.5B)
6. NA, Chemistry and Metallurgy Research Replacement (CMRR)** – LANL (CD-1 Range: $2.4B - $2.9B)
7. FE, Strategic Petroleum Reserve, Life Extension Phase 2 (SPR-LE2) – Multiple (CD-1 Range: $750M - $1.4B)
8. FE, Strategic Petroleum Reserve, Marine Terminal Enhancements (SPR-MTE) – Multiple (CD-0 Range: $0.5B - $1.5B)
9. NA, Plutonium Modular Approach (PMA) – LANL (CD-0 Range: $1.3B - $3B)
10. NA, Trusted Microsystems Capability (TMC) – (CD-0 Range: $900M - $3.7B)
11. NA, Matter-Radiation Interactions in Extremes (MaRIE) – LANL (CD-0 Range: $1.9B - $3.7B)
12. NA, Domestic Uranium Enrichment (DUE) – (CD-0 Range: $3.3B - $14.1B)
13. EM, Calcine Disposition Project – INL (CD-0 Range: $2B - $16B)

Above listing does not include: (Non-Capital Asset Projects and SC Projects)

1. SC, Long Baseline Neutrino Facility (LBNF) – FNAL (CD-1R Range: $1.26B-$1.86B), CD-3A
2. SC, Linac Coherent Light Source II (LCLS-II) – SLAC ($1.045B), CD-2/3
3. SC, Advanced Photon Source-Upgrade (APS-U) – ANL (CD-1 Range: $700M - $1B), CD-3A

* Projects greater than $750 million.
** All CMRR subprojects are less than $750 million.
### March 2016 vs. March 2017 Project Portfolio Status (Then and Now)

<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>Mar 2016 vs. Mar 2017</th>
<th>Total Project Portfolio</th>
<th>Total Active Projects Post CD-2</th>
<th>Total Projects Post CD-2 Green</th>
<th>Total Projects Post CD-2 Yellow</th>
<th>Total Projects Post CD-2 Red</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>No. $(M)</td>
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<td>No. $(M)</td>
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<tr>
<td>EM</td>
<td>2016</td>
<td>37 $52,876</td>
<td>12 $18,031</td>
<td>7 $3,093</td>
<td>--</td>
<td>5 $14,938</td>
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<tr>
<td></td>
<td>2017</td>
<td>43 $55,349</td>
<td>15 $22,241</td>
<td>12 $5,312</td>
<td>--</td>
<td>3 $16,928</td>
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<tr>
<td>NNSA</td>
<td>2016</td>
<td>27 $23,036</td>
<td>6 $5,355</td>
<td>3 $260</td>
<td>1 $93</td>
<td>2 $5,002</td>
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<tr>
<td></td>
<td>2017</td>
<td>40 $40,796</td>
<td>11 $6,642</td>
<td>9 $1,686</td>
<td>1 $99</td>
<td>1 $4,857</td>
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<tr>
<td>SC</td>
<td>2016</td>
<td>32 $8,498</td>
<td>14 $1,302</td>
<td>13 $964</td>
<td>1 $338</td>
<td>--</td>
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<tr>
<td></td>
<td>2017</td>
<td>36 $9,282</td>
<td>17 $2,540</td>
<td>16 $2,202</td>
<td>1 $338</td>
<td>--</td>
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<tr>
<td>Other</td>
<td>2016</td>
<td>4 $1,663</td>
<td>1 $78</td>
<td>1 $78</td>
<td>--</td>
<td>--</td>
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<tr>
<td></td>
<td>2017</td>
<td>6 $3,208</td>
<td>1 $78</td>
<td>1 $78</td>
<td>--</td>
<td>--</td>
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<tr>
<td>Total</td>
<td>2016</td>
<td>100 $86,073</td>
<td>33 $24,766</td>
<td>24 $4,395</td>
<td>2 $431</td>
<td>7 $19,940</td>
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<tr>
<td></td>
<td>2017</td>
<td>125 $108,635</td>
<td>44 $31,501</td>
<td>38 $9,278</td>
<td>2 $437</td>
<td>4 $21,785</td>
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</table>
### Project Management Success Metrics
(Target 90% - Based on 3-year rolling timeline)

<table>
<thead>
<tr>
<th>Capital Asset</th>
<th>FY10 Actual</th>
<th>FY13 Actual</th>
<th>FY14 Actual</th>
<th>FY15 Actual</th>
<th>FY16 Actual</th>
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<tbody>
<tr>
<td>Construction</td>
<td>75% (27/36)</td>
<td>84% (36/43)</td>
<td>82% (31/38)</td>
<td>83% (30/36)</td>
<td>91% (21/23)</td>
</tr>
<tr>
<td>SC</td>
<td>92% (12/13)</td>
<td>100% (17/17)</td>
<td>100% (17/17)</td>
<td>100% (17/17)</td>
<td>100% (14/14)</td>
</tr>
<tr>
<td>EM</td>
<td>--</td>
<td>0% (0/3)</td>
<td>0% (0/2)</td>
<td>--</td>
<td>--</td>
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<tr>
<td>NNSA</td>
<td>68% (15/22)</td>
<td>64% (7/11)</td>
<td>55% (6/11)</td>
<td>54% (7/13)</td>
<td>75% (6/8)</td>
</tr>
<tr>
<td>Other</td>
<td>0% (0/1)</td>
<td>100% (12/12)</td>
<td>100% (8/8)</td>
<td>100% (6/6)</td>
<td>100% (1/1)</td>
</tr>
</tbody>
</table>

Project Management Success: complete project within the original scope and within 110% of the original cost baseline at Critical Decision (CD)-4, over three-year rolling timeline.

Green ≥ 90%; Yellow < 90% to 70%; Red < 70%
<table>
<thead>
<tr>
<th>Contract/Project Management Secondary Performance Metrics</th>
<th>Target</th>
<th>FY10 Actual</th>
<th>FY15 Actual</th>
<th>FY16 Actual</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Certified Earned Value Management (EVM) System:</strong> Post CD-3, 95% of projects (TPC &gt; $20M).</td>
<td>95%</td>
<td>86% Env. Cleanup Line Item</td>
<td>88%</td>
<td>100%</td>
<td>CD-3 is “Approve Start of Construction/Execution.” [Stats: 12 of 12]</td>
</tr>
<tr>
<td><strong>Certified Federal Project Directors (FPDs) at CD-1:</strong> No later than CD-1, 95% of projects have certified FPDs.</td>
<td>95%</td>
<td>98%</td>
<td>100%</td>
<td>94%</td>
<td>CD-1 is “Approve Alternative Selection and Cost Range.” [Stats: 68 of 72]</td>
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<tr>
<td><strong>Certified FPDs at CD-3:</strong> No later than CD-3, 90% of projects have FPDs certified at the appropriate level assigned to projects.</td>
<td>90%</td>
<td>87%</td>
<td>100%</td>
<td>89%</td>
<td>CD-3 is “Approve Start of Construction/Execution.” [Stats: 31 of 35]</td>
</tr>
<tr>
<td><strong>Certified Contracting Staff:</strong> 85% of the “1102” contracting specialist series will be certified.</td>
<td>85%</td>
<td>85%</td>
<td>97%</td>
<td>99%</td>
<td>Includes those with waivers.</td>
</tr>
</tbody>
</table>
EVMS and PARS* Developments

• Earned Value Management System (EVMS) Enhancements
  ✓ Released EVMS Interpretation Handbook v2.0 August 2016
    ▪ Page Count: 456 pages → 172 pages
    ▪ Lines of Inquiry (LOIs): 274 → 134 → 95
    ▪ Test Count: 772 → 597 → 271 (CNS Pilot)
      ❖ Automation: 10% → 19% → 87% (or 235 of 271) (CNS Pilot)
  ✓ Conducted seven roadside assist visits

• PARS* IIe Highlights: “BIRST” software upgrade
  ✓ Effective February 6, 2017 – along with “suggestion box”
  ✓ Improved usability and operability
  ✓ Increased performance and response times
  ✓ Included point-and-click navigation
  ✓ Introduced an analysis and reporting engine
  ✓ Trained the user community

* PARS – Project Assessment and Reporting Systems
The five criteria:
1) Demonstrate strong commitment and leadership
2) Demonstrate progress in implementing corrective measures
3) Develop a corrective action plan that identifies root causes, effective solutions, and a near-term plan
4) Have the capacity (people and resources) to resolve the problems
5) Monitor/independently validate effectiveness and sustainability of corrective measures

<table>
<thead>
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<th>No.</th>
<th>2007</th>
<th>2009</th>
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<th>2013</th>
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</table>

- All of DOE
- NNSA & EM Only
- No change NNSA & EM Only
- NNSA & EM >$750M
- No change NNSA & EM >$750M
PM Website Status (MAX.gov)

• Established intranet website: OMB’s “MAX.gov”

• Content includes:
  • 413 resource center; ESAAB and PMRC repository
  • Review procedures and success metrics
  • Project peer review collaboration site
  • Access to PARS IIe and EVMS guidance
  • FPD training and certification resources

• Internet: still maintain presence on Energy.gov:
  • PM mission, leadership, organization, history
  • Annual awards presented at our Workshops
  • Newsletter (again) and summary monthly report
Closing Thoughts

• The DOE Missions: Diverse – Essential – Amazing
• Our project management is better than ever before – consistent, disciplined implementation is key for continued success
• Our workload is massive – never ending
• Take pride in DOE
• Keep charging!
Questions?