



May 24, 2017

# Department of Energy Atomic Energy Defense Activities and Programs

Subcommittee on Strategic Forces, Committee on Armed Services, United  
States Senate, One Hundred Fifteenth Congress, First Session

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David C. Trimble  
Director  
Natural Resources & Environment Government Accountability Office

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**Available Webcast(s)\*:**

Full Hearing:  
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Stenographic Transcript  
Before the

Subcommittee on Strategic Forces

COMMITTEE ON  
ARMED SERVICES

## **UNITED STATES SENATE**

HEARING TO RECEIVE TESTIMONY ON THE DEPARTMENT OF  
ENERGY'S ATOMIC ENERGY DEFENSE ACTIVITIES AND  
PROGRAMS

Wednesday, May 24, 2017

Washington, D.C.

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1 HEARING TO RECEIVE TESTIMONY ON THE DEPARTMENT OF ENERGY'S  
2 ATOMIC ENERGY DEFENSE ACTIVITIES AND PROGRAMS

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Wednesday, May 24, 2017

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U.S. Senate

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Subcommittee on Strategic

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Forces

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Committee on Armed Services

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Washington, D.C.

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The subcommittee met, pursuant to notice, at 2:30 p.m.  
13 in Room SD-G50, Dirksen Senate Office Building, Hon. Deb  
14 Fischer presiding.

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Committee Members Present: Senators Fischer

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[presiding], Inhofe, Sullivan, Donnelly, Heinrich, Warren,  
17 and Peters.

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1           OPENING STATEMENT OF HON. DEB FISCHER, U.S. SENATOR  
2 FROM NEBRASKA

3           Senator Fischer: Good afternoon, everyone. The  
4 hearing will come to order.

5           The subcommittee meets today to receive testimony on  
6 the Department of Energy's atomic energy defense activities,  
7 and I thank our distinguished panel before us for their  
8 service and for agreeing to appear before us.

9           Of the missions represented here today, there is no  
10 higher priority than maintaining the safety and the  
11 reliability of our nuclear stockpile.

12          General Klotz, we look forward to hearing an update  
13 from you on the life extension programs and major  
14 alterations that NNSA is currently performing, in particular  
15 the B61-12, which will be carried by our nuclear-certified  
16 aircraft, and the W80-4, which will be the warhead for the  
17 long-range standoff weapon, another system that we need in  
18 order to maintain our deterrence.

19          Modernizing the infrastructure and scientific  
20 capabilities that make up NNSA's nuclear complex is also  
21 vitally important. As General Hyten testified earlier this  
22 year, in concert with our delivery platforms, our nuclear  
23 weapons stockpile and the unique facilities that sustain the  
24 stockpile must be modernized to ensure our deterrent remains  
25 effective and credible.

1 I remain concerned that we are not making enough  
2 progress in this area. Warheads continue to age, the geo-  
3 political landscape continues to change, and we must ensure  
4 that progress toward a responsive nuclear enterprise is  
5 keeping pace.

6 Admiral Caldwell and Ms. Cange, we will also be  
7 interested in hearing updates from each of you on the  
8 programs within your purview. Additionally, we would  
9 appreciate your assessment on whether the newly-released  
10 budget adequately meets the needs of your missions and where  
11 it accepts risk.

12 With that, I recognize the ranking member, Senator  
13 Donnelly, for any opening remarks he'd like to make.

14 Senator Donnelly?

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1 STATEMENT OF HON. JOE DONNELLY, U.S. SENATOR FROM  
2 INDIANA

3 Senator Donnelly: Thank you, Madam Chair.

4 This subcommittee has a strong history of bipartisan  
5 support for modernization of our nuclear deterrent in which  
6 the National Nuclear Security Administration plays a central  
7 role. I want to thank today's witnesses for joining us to  
8 testify on the Fiscal Year 2018 budget request for defense  
9 programs at the Department of Energy.

10 Administrator Klotz, I am glad you have stayed on at  
11 the Department of Energy through this transition. With so  
12 many important modernization activities underway, it's  
13 essential these operations move forward with minimal  
14 disruption.

15 I want to hear from you what the National Nuclear  
16 Security Administration is doing to ensure our warhead life  
17 extension programs stay on track and that your organization  
18 is heeding lessons learned and best practices gathered from  
19 the many reports on your operations over the past several  
20 years.

21 Admiral Caldwell, it's good to see you again. Thanks  
22 for making the time to come down to Newport News last month  
23 for the christening of the future U.S.S. Indiana, a  
24 submarine that is close to the heart of every Hoosier. It  
25 was good to have you there. I look forward to hearing from

1 you about progress on the Columbia-class submarine and the  
2 ongoing infrastructure modernization across the naval  
3 reactors complex.

4 Ms. Cange, welcome. The Environmental Management  
5 Program undertakes some of the Energy Department's most  
6 complex work. We'll want to hear about the status of  
7 operations at the Waste Isolation Pilot Plant and the  
8 storage tunnel collapse at Hanford, among other things.

9 And, Mr. Trimble, as always, we're grateful to you and  
10 your staff for the excellent work you do in support of this  
11 subcommittee. I look forward to your testimony.

12 Thank you, Madam Chair.

13 Senator Fischer: Thank you, Senator.

14 Before we begin with our statements from the panel, I  
15 would like to announce that we have two votes today at 3:00.  
16 When there's about two minutes left in the first vote, the  
17 committee will recess until after we take our second vote,  
18 and then we will be back.

19 And with that, I would ask for our panelists to give us  
20 their opening statements, knowing that your full statement  
21 will be included in the record.

22 General Klotz, welcome.

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1           STATEMENT OF HON. FRANK G. KLOTZ, UNDER SECRETARY FOR  
2 NUCLEAR SECURITY, DEPARTMENT OF ENERGY

3           General Klotz: Thank you, Chairwoman Fischer, Ranking  
4 Member Donnelly, and Senator Inhofe, and other members of  
5 the subcommittee who will show up. Thank you for the  
6 opportunity to present the President's Fiscal Year 2018  
7 budget request for the Department of Energy's National  
8 Nuclear Security Administration.

9           We value this committee's strong support for the  
10 nuclear security mission and for the people and the  
11 organizations that are responsible for executing it.

12           Our budget request, which comprises approximately half  
13 of DOE's budget, is \$13.9 billion. This represents an  
14 increase of \$1 billion, or 7.8 percent, over the Fiscal Year  
15 2017 omnibus level.

16           This budget request demonstrates the Administration's  
17 strong support of NNSA's diverse missions. As you will  
18 recall, those are maintaining the safety, security,  
19 reliability, and effectiveness of the nuclear weapons  
20 stockpile; reducing the threat of nuclear proliferation and  
21 nuclear terrorism at home and around the world; and  
22 providing naval nuclear propulsion to the U.S. Navy's fleet  
23 of aircraft carriers and submarines.

24           The budget materials we have provided describe NNSA's  
25 major accomplishments in Fiscal Year 2016, as well as the

1 underlying rationale for our budget proposal for the coming  
2 fiscal year. Let me just briefly highlight a few of the  
3 points that are explained in greater detail in our written  
4 submission.

5 This budget request is vital to ensuring that U.S.  
6 nuclear forces are modern, robust, flexible, resilient,  
7 ready, and appropriately tailored to 21st-century threats  
8 and to reassure our allies. NNSA's Fiscal Year 2018 budget  
9 request for the weapons activity appropriation is \$10.2  
10 billion, an increase of nearly \$1 billion, or 10.8 percent  
11 over the Fiscal Year 2017 omnibus level. This increase is  
12 needed to both meet our current life extension program  
13 commitments and to modernize our research and production  
14 infrastructure so we are positioned to address future  
15 requirements and future challenges.

16 The budget request will enable NNSA to meet its program  
17 objectives, including beginning construction of the main  
18 process building and the salvage and accountability building  
19 at the Y-12 uranium processing facility in Oak Ridge,  
20 Tennessee; and restoring the nation's capability to  
21 manufacture plutonium pits on the timeline required to meet  
22 future stockpile needs.

23 The Fiscal Year 2018 budget request also includes \$1.8  
24 billion for the Defense Nuclear Non-Proliferation Account,  
25 which is consistent with the enacted funding level for

1 Fiscal Year 2017. This appropriation continues NNSA's  
2 critical and far-reaching mission to prevent, counter, and  
3 respond to nuclear threats.

4 The request for our third appropriation, the Naval  
5 Reactors Program, is \$1.48 billion; and, of course, it's a  
6 delight to be here with Admiral Caldwell, who can discuss  
7 the details of that appropriation account. It represents an  
8 increase of \$60 million, or 4.2 percent above the Fiscal  
9 Year 2017 omnibus level. Not only does the requested  
10 funding support today's operational fleet, it also enables  
11 Naval Reactors to deliver tomorrow's fleet by funding three  
12 national priority projects: developing the Columbia-class  
13 reactor plant, as you indicated; refueling a research and  
14 training reactor in New York; and building a new spent fuel  
15 handling facility in Idaho.

16 As NNSA executes our three vital missions, we are  
17 mindful of our obligation to continually improve our  
18 business practices and to be responsible stewards of the  
19 resources that Congress and the American people have  
20 entrusted to us. NNSA is committed to encouraging  
21 competition and streamlining its major acquisition  
22 processes. Recent competitions for management and  
23 operations contracts have generated extraordinary interest  
24 from industry and academic institutions, validating the  
25 acquisition and program management improvements that we have

1 instituted over the last five years.

2 Finally, our budget request for Federal salaries and  
3 expenses is \$418 million, an increase of \$31 million, or 8.1  
4 percent over the Fiscal Year 2017 omnibus level. This  
5 request supports recruiting, training, and retaining the  
6 highly skilled Federal workforce essential to achieving  
7 success in technically complex, 21st-century national  
8 security missions.

9 Since 2010, NNSA's program funding has increased 28  
10 percent. However, at the same time, our staffing has  
11 decreased 17 percent. The Fiscal Year 2018 budget request  
12 supports a modest increase of 25 full-time equivalent  
13 employees over the current cap of 1,690 full-time equivalent  
14 employees. Phase I of a study by the Office of Personnel  
15 Management confirms that NNSA needs additional Federal  
16 staff.

17 In closing, our Fiscal Year 2018 budget request  
18 reflects our motto: "Mission first, people always." It  
19 accounts for the significant tempo of operations at NNSA,  
20 which in many ways has reached a level unseen since the end  
21 of the Cold War. It includes long overdue investments to  
22 repair and replace aging infrastructure at our national  
23 laboratories and our production plants, and it provides  
24 modern and more efficient workspace for our highly trained  
25 scientific, engineering, and professional workforce.

1           Again, thank you for the opportunity to appear before  
2 this subcommittee today.

3           [The prepared statement of General Klotz follows:]

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1 Senator Fischer: Thank you, General.

2 Ms. Cange, please. Welcome.

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1 STATEMENT OF SUSAN M. CANGE, ACTING ASSISTANT  
2 SECRETARY OF ENERGY FOR ENVIRONMENTAL MANAGEMENT, DEPARTMENT  
3 OF ENERGY

4 Ms. Cange: Thank you, and good afternoon, Chairwoman  
5 Fischer, Ranking Member Donnelly, and members of the  
6 subcommittee. I'm pleased to be here today to represent the  
7 Department of Energy's Office of Environmental Management  
8 and to discuss the important work we have recently  
9 accomplished, as well as what we plan to achieve under the  
10 President's Fiscal Year 2018 budget request.

11 The total budget request for the EM program is \$6.5  
12 billion, and, of that, \$5.5 billion is for defense  
13 environmental cleanup activities.

14 Before discussing our request, I'd like to provide a  
15 brief update on the recent incident at the Hanford site. As  
16 you know, on May 9th, there was a partial collapse of one  
17 tunnel near the Purex facility. The tunnel has been used  
18 since the 1950s to store contaminated equipment. Based on  
19 extensive monitoring, there has been no release of  
20 radiological contamination and no workers were injured.

21 Workers have filled in the collapsed section with soil  
22 and placed a cover over the tunnel. We're continuing to  
23 ensure that our workers and the public are protected, and we  
24 are working closely with the State of Washington for a more  
25 permanent solution.

1           We take this event very seriously and are looking  
2 closely at lessons learned. Maintaining and improving aging  
3 infrastructure is a priority for the EM program, and this  
4 incident emphasizes the need to continue to focus on these  
5 efforts.

6           With regard to recent accomplishments, we continue to  
7 demonstrate our ability to make significant progress through  
8 achievements like resuming shipments of transuranic waste to  
9 the Waste Isolation Pilot Plant, or WIPP; completing the  
10 exhumation and packaging of 65,000 cubic meters of buried  
11 waste at Idaho; and completing removal of all of the waste  
12 from the 618-10 burial grounds at the Hanford site.

13           Our Fiscal Year 2018 budget request will enable us to  
14 build on this momentum. The request allows EM to continue  
15 to make progress in addressing radioactive tank waste, as  
16 well as continue other important work such as deactivation  
17 and decommissioning, soil and groundwater remediation; and  
18 management and disposition of special nuclear materials,  
19 spent nuclear fuel, and transuranic and solid waste.

20           Our request also includes funding to support the  
21 National Nuclear Security Administration by tackling some of  
22 their higher priority excess facilities in Oak Ridge and at  
23 the Lawrence Livermore National Laboratory.

24           In particular, the Fiscal Year 2018 request supports  
25 continued waste emplacement activities at WIPP. At the

1 Savannah River site, the request supports the commissioning  
2 and start-up of the Salt Waste Processing Facility. And at  
3 Hanford, the budget request supports continued site  
4 remediation along the river corridor; and it supports  
5 beginning to treat low-activity tank waste by 2023.

6 In closing, I'm honored to be here today representing  
7 the Office of Environmental Management. We're committed to  
8 achieving our missions safely and successfully. I'd like to  
9 thank you for this opportunity and would be pleased to  
10 answer any questions, as time permits.

11 [The prepared statement of Ms. Cange follows:]

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1 Senator Fischer: Thank you very much.

2 Admiral Caldwell, welcome, sir.

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1           STATEMENT OF ADMIRAL JAMES F. CALDWELL, JR., USN,  
2 DEPUTY ADMINISTRATOR FOR NAVAL REACTORS, NATIONAL NUCLEAR  
3 SECURITY ADMINISTRATION

4           Admiral Caldwell: Thank you, Chairwoman Fischer and  
5 Ranking Member Donnelly, and distinguished members of this  
6 subcommittee. Thank you for the opportunity to testify  
7 before you today. This is my second appearance before this  
8 subcommittee, and I am grateful for the tremendous support  
9 that the subcommittee has shown Naval Reactors. Your  
10 support is essential to our program.

11           Since I last testified before this subcommittee, U.S.  
12 nuclear-powered warships, which include 10 aircraft  
13 carriers, 14 ballistic missile submarines, 57 attack  
14 submarines, and 4 guided missile submarines, have steamed  
15 over 2 million miles in support of national security  
16 missions. We have 101 reactors across our program that  
17 operated safely and effectively for another year. This is a  
18 true testament to the sailors who operate these propulsion  
19 systems and the technical base that supports them.

20           Nuclear power is a key enabler to the success of our  
21 nation's Navy, both in the missions it supports and the  
22 capability advantage that it affords over adversaries.  
23 Nuclear-powered submarines and aircraft carriers make up  
24 over 45 percent of the Navy's major combatants, and as we  
25 move forward it is vital to our national security to

1 continue to build and improve upon these incredible assets.

2 Last year marked the start of an ongoing program that  
3 delivers two Virginia-class submarines annually. Recently,  
4 the Navy commissioned the attack submarine Illinois,  
5 completed initial C trials on PCU Washington, and christened  
6 the Colorado and the Indiana. And just this last month we  
7 completed C trials on the Ford, the nation's newest aircraft  
8 carrier.

9 Having witnessed Ford's propulsion plant testing  
10 firsthand, I am happy to report that in terms of propulsion  
11 capability, Ford met the high speed of our Nimitz-class  
12 carriers while delivering major increases in electrical  
13 power generation and core energy with half of the manning in  
14 the reactor department.

15 Nuclear power continues to play an important role in  
16 our military strategic deterrent mission. Our ballistic  
17 missile submarine force achieved over 60 years of  
18 peacekeeping through continuous at-sea strategic deterrence.  
19 This milestone occurs as the nation is preparing to  
20 recapitalize the ballistic missile submarine force through  
21 the procurement of the Columbia-class ballistic missile  
22 submarine. That will enable undersea deterrence through the  
23 year 2080.

24 Over the past year our technical base of scientists,  
25 engineers, and logisticians were vital to the continued

1 operation of the Navy's nuclear fleet. This core team  
2 directly supports the Navy's ability to maintain a forward-  
3 deployed carrier, three battle group deployments last year,  
4 33 submarine deployments, and 32 strategic ballistic missile  
5 deterrent patrols.

6 Our progress in mandatory oversight of the safe  
7 operation of the fleet is only possible through the support  
8 of this subcommittee. Naval Reactors funding request for  
9 Fiscal Year 2018 allows us to continue this important work.  
10 The funding request is for \$1.48 billion. That's  
11 approximately a 4 percent increase over the Fiscal Year 2017  
12 enacted funding level. This request enables us to deliver  
13 tomorrow's fleet while recapitalizing critical program  
14 facilities and infrastructure, while performing research and  
15 development, and funding three national priority projects,  
16 which are the continued design of the new propulsion plant  
17 for the Columbia SSBN, which will feature a life-of-core  
18 reactor and electric drive; refueling a research and  
19 training reactor in New York to facilitate the Columbia-  
20 class reactor manufacturing development efforts, which will  
21 also provide 20 more years of training fleet operators; and  
22 building a new spent fuel handling facility in Idaho that  
23 will facilitate long-term, reliable processing and packaging  
24 of naval spent nuclear fuel.

25 The budget request supported by sustained and

1 predictable funding levels also permits Naval Reactors to  
2 support today's operational fleet by recruiting and  
3 retaining talented engineers, technicians, and scientists  
4 that make up the technical base. This technical base  
5 includes world-class laboratory and reactor facilities and  
6 allows me to support maintenance and modernization  
7 investments that are critical to the fleet.

8 Madam Chairwoman, our Fiscal Year 2018 budget request  
9 is part of a closely coordinated Department of Navy and  
10 Department of Energy budget that supports both my  
11 responsibility to regulate the safe and effective operation  
12 of the nuclear fleet, and Naval Reactors roles in both  
13 departments to support the security of our nation and our  
14 future security. We will accomplish this with industry  
15 partners while maintaining high standards for safety and  
16 environmental stewardship.

17 Again, thank you for your longstanding support, and I  
18 look forward to discussing my program with you.

19 [The prepared statement of Admiral Caldwell follows:]

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1 Senator Fischer: Thank you, Admiral.

2 Director Trimble, welcome.

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1 STATEMENT OF DAVID C. TRIMBLE, DIRECTOR, NATURAL  
2 RESOURCES AND ENVIRONMENT GOVERNMENT ACCOUNTABILITY OFFICE

3 Mr. Trimble: Thank you, Chairman Fischer, Ranking  
4 Member Donnelly, and members of the subcommittee. My  
5 testimony today will address the affordability of NNSA's  
6 nuclear modernization programs, the growing cost of DOE's  
7 environmental liabilities, DOE's efforts to improve its  
8 management of contracts and projects, and assessing  
9 performance in the non-proliferation program.

10 NNSA faces challenges with the affordability of its  
11 nuclear modernization programs. In our review of the Fiscal  
12 Year 2017 SSMP, we found misalignment between NNSA's  
13 modernization plans and projected budgetary resources, which  
14 could make it difficult for NNSA to afford its planned  
15 portfolio of modernization programs.

16 We identified two areas of misalignment. First, NNSA's  
17 estimates of program costs exceeded the projected budgetary  
18 resources included in the President's planned near- and  
19 long-term modernization budgets. For example, we found that  
20 to stay within five-year budget limits, NNSA continues to  
21 push work out beyond the FYNSP, something it has repeatedly  
22 done in the past. Such "bow waves" of increased future  
23 budget needs often occur when agencies are undertaking more  
24 program than their resources can support.

25 Long-term modernization budgets also show a shortfall,

1 with program costs of about \$3 billion more than the  
2 projected budgets.

3 Second, the cost of three LAPs -- the B61, W80, and W88  
4 -- could be about \$4 billion higher than estimated.  
5 Moreover, projected budgets for some programs are not always  
6 sufficient to cover even the low end of projected costs.

7 Addressing the affordability challenges facing the  
8 modernization effort is complicated by DOE's growing  
9 environmental liabilities, which defense up-budgets will  
10 also need to fund. This year we added the Federal  
11 Government's environmental liabilities to our high-risk  
12 list. Notably, DOE is responsible for \$372 of the \$450  
13 billion Federal total. Further, over the past six years, EM  
14 has spent about \$35 billion on cleanup, while its  
15 liabilities have grown by \$90 billion in the same time  
16 period. Also of concern is that these liability estimates  
17 do not include all future cleanup responsibilities.

18 We and others have found that DOE has not consistently  
19 taken a risk-informed approach to decision-making for  
20 environmental cleanup. Our recent work has identified  
21 opportunities where DOE may be able to save tens of billions  
22 of dollars such as by taking a risk-informed approach to  
23 treating a portion of the low-activity waste at the Hanford  
24 site.

25 Regarding DOE contract and project management, which

1 has been on GAO's high-risk list for several decades, DOE  
2 has taken several important steps, including requiring the  
3 development of cost estimates in accordance with best  
4 practices, creating new oversight structures, and ensuring  
5 that major projects, designs, and technologies are  
6 sufficiently mature before construction.

7 But significant work remains. First, DOE still lacks  
8 reliable enterprise-wide cost information. Without this  
9 information, meaningful cost analyses across programs,  
10 contractors, and sites are not possible. NNSA needs to  
11 develop a comprehensive plan to address this issue.

12 Second, DOE has not established a policy on program  
13 management or a training program for program managers.  
14 Program management can help ensure that a group of related  
15 projects and activities are managed in a coordinated way to  
16 obtain benefits not available for managing them  
17 individually.

18 Third, DOE's acquisition planning for major contracts  
19 could be improved. While DOE has since revised its  
20 guidance, in our last report we found that it had not  
21 considered an acquisition alternative beyond continuing its  
22 longstanding M&O approach in 16 of the 22 cases we examined.  
23 By not considering alternative structures, DOE could not be  
24 sure that it had selected the most effective form of  
25 contracts for billions in annual spending.

1 Fourth, DOE has not consistently applied its recent  
2 reforms to its largest legacy cleanup project at the Hanford  
3 site. In light of longstanding challenges with the WTP and  
4 the billions of dollars yet to be spent, DOE should ensure  
5 that its improved controls are applied to its largest and  
6 most troubled project.

7 Finally, DOE's efforts to ensure contractors maintain  
8 an environment for workers to raise concerns without fear of  
9 reprisals has not been sufficient. As we reported,  
10 management must foster a culture in which workers are  
11 encouraged to identify risks and use their expertise to  
12 proactively mitigate them.

13 And lastly, regarding non-proliferation, DNN faces  
14 challenges with assessing the performance of some of its  
15 programs. We found that DNN's R&D results were not being  
16 tracked consistently to help evaluate the success of that  
17 program. In addition, we found that DOE did not have  
18 measureable goals supporting its plans and efforts to deploy  
19 and support detection equipment overseas.

20 Also related to non-proliferation, let me note that we  
21 have ongoing work for this committee related to MOX and  
22 WIPP.

23 Thank you, and I'd be happy to answer any questions you  
24 may have.

25 [The prepared statement of Mr. Trimble follows:]

1 Senator Fischer: Thank you, Director.

2 We will begin the first round of questioning, 7-minute  
3 rounds, please.

4 General Klotz, I appreciate the work that NNSA has done  
5 in tandem with Los Alamos to repurpose existing lab space  
6 and take initial steps to rebuild our pit production  
7 capacity. However, last year you testified before this  
8 subcommittee that additional capacity would be required and  
9 that the NNSA was conducting an analysis of alternatives to  
10 determine the Department's future plutonium strategy.

11 Can you tell me what the status is of that AOA, please?

12 General Klotz: Yes, ma'am. The AOA is still underway.  
13 We expect that it will be completed in the summer timeframe.

14 Senator Fischer: Are there any additional studies that  
15 are going to be required, or do you expect the AOA to select  
16 a way forward and to allow us to move out on this?

17 General Klotz: I expect the AOA will inform us as the  
18 way to go forward. Now, the AOAs themselves are not  
19 necessarily dispositive in terms of what the final outcome  
20 will be. They're designed to inform the decision-makers  
21 within NNSA and within the Department and the Congress as to  
22 what the various options are and what the various advantages  
23 and disadvantages of a particular option are.

24 Senator Fischer: At this point, do you believe that  
25 that will be enough, that the AOA is going to be able to

1 present options and that we're going to be able to move  
2 forward, or do you think there will be other studies  
3 required?

4 General Klotz: Well, we will do other -- as part of  
5 the process which Director Trimble, in fact, outlined, in  
6 several parts of it, we do analysis of alternatives, we do  
7 independent cost estimates, we examine the particular risks  
8 of the various ways forward. But the first step in that  
9 process is to do an analysis of alternatives to know the  
10 places that we can go.

11 But I'm glad you raised this because as a nation we no  
12 longer have the capability to manufacture plutonium pits for  
13 our nation's nuclear weapons stockpile, and the Congress has  
14 given us clear direction to rebuild that capability, and we  
15 are on track to be able to. In fact, this year we have  
16 already fabricated, Los Alamos has fabricated some  
17 development pits at Los Alamos. With this budget, if it's  
18 approved by the Congress, we'll fabricate four additional  
19 developmental pits, working our way towards the ability to  
20 do 10 pits in 2024, and then growing up to eventually get to  
21 the point where we'll be able to demonstrate the capacity to  
22 do 80 pits a year.

23 But we can only do 30, we think, at the current  
24 facilities, which, as you rightly pointed out, we're  
25 repurposing Plutonium Facility 4, PF4, and in the radiation

1 laboratory. We're going to need additional capacity,  
2 additional floor space to get from about the 30 level up to  
3 the 80 level. So that's why we're pursuing this analysis of  
4 alternatives to educate and inform us, inform decision-  
5 makers on the best option for achieving that capability.

6 Senator Fischer: So as we look at the budget request  
7 that this subcommittee and the full committee is going to be  
8 receiving, will that give us that capacity to be able to  
9 reach that goal of 80, or are we going to have to address  
10 that in the future? Is it included in the budget request  
11 here, or are we going to be having this conversation again  
12 in the future?

13 General Klotz: Well, we'll be having this conversation  
14 again in the future because our budget request for Fiscal  
15 Year 2018 is to pay for the program in Fiscal Year 2018. We  
16 do not have --

17 Senator Fischer: Not the facilities.

18 General Klotz: Well, the facilities, but also all the  
19 other things we need to do with our plutonium sustainment  
20 operations at Los Alamos and elsewhere. But you will not  
21 see in this budget the FYNSP numbers in great fidelity  
22 beyond this particular fiscal year request, and the reason  
23 for that, quite simply, is that with the new administration  
24 we are in the process of conducting a nuclear posture  
25 review, and the results of that nuclear posture review I

1 think will be very important for what we have to fund and  
2 where the priorities will be in the years ahead.

3 Senator Fischer: Are we looking at any funding wedges  
4 that have been built into this budget request to execute the  
5 path forward that's going to be determined by the AOA?

6 General Klotz: I don't know that there are any wedges  
7 in there. I think the number that we have given you for  
8 Fiscal Year 2018 is what we need to cover the cost of that.  
9 I think last year we did have some wedges in there to  
10 indicate to the Congress that there would have to be some  
11 spending in that particular area. But remember, we don't  
12 baseline a program until we have gone through this very  
13 methodical process that Director Trimble laid out. So we're  
14 not at that point where we have the fidelity of numbers to  
15 say what it's going to be two years from now, four years  
16 from now, five years from now.

17 Senator Fischer: So this wasn't a decision made by the  
18 OMB or by the NNSA. It's just that you haven't reached that  
19 point yet where you can put it in?

20 General Klotz: That's right. We have not reached that  
21 point on this particular aspect of the plutonium strategy.

22 Senator Fischer: Okay. What does that mean about your  
23 request for the additional funding as we move through this  
24 process beyond the years, the out-years of this budget?  
25 Will that come to us later?

1           General Klotz: It will. I think it will come in the  
2 Fiscal Year 2019 budget's mission, which we are already in  
3 the process of working.

4           Senator Fischer: Have you factored that in? Are you  
5 looking to factor that in already for the 2019 budget?

6           General Klotz: Yes, absolutely. And again --

7           Senator Fischer: Is that why you're not asking for it  
8 now?

9           General Klotz: Well, again, we're asking --

10          Senator Fischer: I just want to know if you're asking  
11 for what you need, or if you are being overly conservative.

12          General Klotz: We're asking for what we need in Fiscal  
13 Year 2018, and what we need beyond will be factored in as we  
14 build the Fiscal Year 2019 budget, informed by the  
15 deliberations and the results that take place in the nuclear  
16 posture review.

17          Senator Fischer: Okay. Thank you, sir.

18          Senator Donnelly?

19          Senator Donnelly: Thank you, Madam Chair.

20          Administrator Klotz, Naval Service Warfare Center in  
21 Indiana works with Sandia and others on ensuring the quality  
22 and reliability of radiation-hardened microelectronics in  
23 our strategic systems. With the progressive off-shoring of  
24 U.S. manufacturing capabilities, it's an issue of growing  
25 importance for both strategic and conventional military

1 systems.

2 The microelectronics facility at Sandia is due for  
3 replacement over the next 10 years. What actions are being  
4 taken to start this process, and what options are you  
5 looking at to make sure we take care of everything?

6 General Klotz: Thank you. I think you've laid the  
7 problem statement out very well, Senator. We have a  
8 specialized need within the nuclear security enterprise for  
9 a particular type of microelectronics. These have to be  
10 what we call radiation hardened, and there are different  
11 types of radiation hardened. The radiation hardening you  
12 might need for a space system is different than the  
13 radiation hardening you need for a nuclear weapons system  
14 given the types of threats that it might encounter from what  
15 we call the stockpile-to-target sequence.

16 You're right, there has been a lot of off-shoring, not  
17 only off-shoring of microelectronic production but also  
18 foreign ownership of that. So when we're dealing with  
19 microelectronics for nuclear weapons systems, they have to  
20 be absolutely trusted.

21 We have relied upon the silicon fabrication facility at  
22 Sandia for a number of years to provide a lot of our  
23 capability in this area. As you indicated, there are two  
24 things that are going on. One is what the rest of industry  
25 is doing in terms of the size of the equipment that they

1 use, in terms of production. We've gone from 6-inch wafers  
2 -- that's what we make now. The rest of industry is already  
3 at 12-inch silicon wafers. So we're in the process now of  
4 doing a revitalization of the Sandia silicon fabrication  
5 facility to allow us to work with 8-inch wafers, which will  
6 hold us over until we go to the next level. And then we  
7 believe that in 2025 we're going to need to be in the  
8 process of recapitalizing the capability to do radiation-  
9 hardened microelectronics for ourselves.

10       There is currently an analysis of alternatives which is  
11 getting very, very close to being finished. I believe the  
12 initial results are already in the building. Now, let me  
13 just say there's a lot of talk about whole-of-government  
14 approaches and partnering. Frank Klotz' own personal  
15 opinion is we are a niche market or a niche customer as far  
16 as this particular market is concerned, and our needs are  
17 relatively small and may not necessarily be the needs for  
18 the commercial or other government agencies. So we're going  
19 to have to approach this with making sure that our priority  
20 of having the types of microelectronics that we need for our  
21 purposes are met with whatever alternative we come up with.

22       Senator Donnelly: Well, as a niche market, who do you  
23 get to service that market? And do you ensure that it's  
24 secure in the United States? How do you ensure the security  
25 of it, and are we best off serving the niche market

1 ourselves?

2           General Klotz: Well, I'm not going to pre-judge the  
3 outcome of the analysis alternatives. I will tell you  
4 personally I agree with the statement that you just made.  
5 This will have to be, in our view, one that is manufactured  
6 in the United States where we can be very, very clear where  
7 these materials have come from.

8           Now, without getting into too many details, there are  
9 ways in which you can buy things from the front end and make  
10 sure on the back end that you have done the type of  
11 engineering that's necessary to enhance your confidence in  
12 the material itself. There are other approaches that we're  
13 working on in our laboratories and our production facilities  
14 to be able to assess, for want of a better word, the  
15 trustworthiness of a particular part. I think we would have  
16 to discuss that in a different setting to get into the  
17 details of that.

18           But this is a great, great concern of ours, and I  
19 suspect as well for the entire Department of Defense and the  
20 rest of the national security agencies in this country,  
21 where the sources of not only microelectronics but other key  
22 components that we use in the course of conducting our  
23 business are made and manufactured, given the amount of  
24 material that in the commercial world comes from overseas or  
25 from companies that overseas entities have a major equity

1 share in.

2 Senator Donnelly: Thank you.

3 Ms. Cange, I want to hear from you on the collapse of  
4 the tunnel at Hanford that stored contaminated equipment.  
5 The tunnel was first constructed in 1956. Referencing  
6 wooden beams used on two sides of the tunnel, the most  
7 recent structural integrity study conducted in 1991  
8 recommended that, and I quote, "If a decision for final  
9 disposition is not made by the year 2001, the structural  
10 integrity again should be reviewed in light of any available  
11 information, including further tests on wood preservation  
12 that may have been completed at that time."

13 First, did the Department conduct any further  
14 structural integrity reviews after 2001? And will you be  
15 conducting an analysis of the structural integrity of the  
16 tunnel at any point in the near future?

17 Ms. Cange: To answer the first part of your question,  
18 the Department has not done any structural integrity tests  
19 since 2001 of the Purex tunnel. However, we have recently  
20 received an administrative order from the State of  
21 Washington in response to the collapse, and one of the  
22 requirements is that we do perform a structural integrity  
23 study and submit it to the state. That study is due by July  
24 1st of this year, and so we are undergoing that study, as  
25 well as really focusing on what measures we're going to take

1 to ensure protection looking into the future and coming up  
2 with a longer-term and permanent solution to the tunnel and  
3 the materials in the tunnel.

4 Senator Donnelly: Thank you.

5 Thank you, Madam Chair.

6 Senator Fischer: Thank you, Senator.

7 Senator Sullivan?

8 Senator Sullivan: Thank you, Madam Chair.

9 Senator Fischer: I would remind the Senator that we  
10 have a vote. So when you're finished, we're going to  
11 adjourn until after the second vote is completed. Thank  
12 you.

13 Senator Sullivan: I wanted to ask about the Iran  
14 nuclear deal and to what degree you were involved in not  
15 only the negotiation but the compliance report. So, under  
16 the parameters of that agreement, Iran is restricted to 130  
17 metric tons of heavy water. However, in 2016 the IAEA  
18 reported that Iran had, in fact, surpassed that threshold  
19 twice.

20 Madam Chair, I ask unanimous consent for the record  
21 that this is an article entitled, "U.N. Agency IAEA Reports  
22 Iran Has Again Violated Terms of the Nuclear Deal."

23 Senator Fischer: Without objection.

24 [The information referred to follows:]

25 [SUBCOMMITTEE INSERT]

1           Senator Sullivan: So, were you familiar with that  
2 violation that the IAEA had cited in 2016, Mr. Klotz?

3           General Klotz: Yes, sir.

4           Senator Sullivan: And do you agree with that  
5 assessment, that that was a violation, from the IAEA?

6           General Klotz: I agree with the IAEA's assessment.

7           Senator Sullivan: So were you asked, when Secretary  
8 Tillerson recently sent a letter to Congress certifying that  
9 Iran was in compliance with the agreement, with the Iran  
10 nuclear agreement -- how do you square those two issues?  
11 Obviously, they were in violation last year. Were you asked  
12 to comment on the Tillerson letter to the Congress?

13           General Klotz: Let me answer it this way, Senator.  
14 The State Department clearly has the lead on all actions  
15 associated with the Joint Comprehensive Plan of Action or  
16 the Iran deal. The role of the Department of Energy and the  
17 National Nuclear Security Administration is to be able to  
18 draw upon the scientific and technical know-how and  
19 knowledge that's resident within our national laboratories,  
20 all 17 DOE national laboratories.

21           Senator Sullivan: Like heavy water issues.

22           General Klotz: Yes, sir.

23           Senator Sullivan: I'm sure the members of your  
24 organization are much more expert on that than State  
25 Department diplomats.

1           General Klotz:  Yes.  There's another area where we are  
2  involved, and I think it's worth pointing out, and that is  
3  the support which NNSA in particular in our laboratories,  
4  again, and our production facilities provide to the  
5  International Atomic Energy Agency, whose headquarters is in  
6  Vienna.  We help them develop a lot of the technology which  
7  they use to assess not only what's going on in Iran but with  
8  all other partners to the Nuclear Non-Proliferation Treaty  
9  who are subject to safeguards, inspections, and compliance  
10  by the IAEA.  We help them write their technical manuals on  
11  safety, on security, on peaceful use of nuclear weapons.  
12  And we also, quite frankly, provide a lot of the talent  
13  either by sending people over there for short periods of  
14  time or actually detailing people to the International  
15  Atomic Energy Agency.

16           Senator Sullivan:  Let me ask -- I hate to interrupt,  
17  but let me ask just a basic question.  Given your expertise,  
18  given that you agreed with the IAEA just a few months ago  
19  that Iran was actually in violation of the agreement, how do  
20  we get to the point that just a few months later we're now  
21  saying that Iran is in compliance with the agreement?  Do  
22  you have a sense of that?  Did they ship the heavy water  
23  out?  Did they try to cure this violation?  I mean, it's  
24  very confusing to those of us who try to follow this  
25  agreement and think it has a lot of flaws.

1           General Klotz: Well, in the specific case of the heavy  
2 water, again, treading on the State Department's area of  
3 responsibility --

4           Senator Sullivan: But again, you're much more of an  
5 expert on heavy water than they are.

6           General Klotz: In the area of heavy water, what they  
7 did is they shipped out -- to get to the actual day on which  
8 the agreement was formally recognized as being implemented,  
9 they shipped out heavy water, and as they approached the  
10 limit that you mentioned --

11          Senator Sullivan: One-hundred and thirty metric tons.

12          General Klotz: -- they also shipped that out. And I  
13 would have to get back to what we know --

14          Senator Sullivan: How about you get back to us on  
15 that?

16          General Klotz: Yes.

17          Senator Sullivan: Because it sounds like, you know, a  
18 couple of months ago you and the IAEA were in agreement that  
19 there was a violation, and somehow we get to the point last  
20 -- I don't know, Secretary Tillerson sent this letter three  
21 weeks ago -- that they're no longer in it. It's confusing  
22 to a lot of us. Would you, for the record, like to --

23          General Klotz: Sure.

24          Senator Sullivan: Maybe in conjunction with the State  
25 Department?

1           General Klotz: I'd be happy to undertake that. Yes,  
2     Senator.

3           Senator Sullivan: Let me ask another question, a very  
4     different question, and I think again, Mr. Under Secretary,  
5     I think you're the point person on this. You know, the  
6     counter-WMD mission, which is a really important one,  
7     doesn't get a lot of discussion. The lead for that recently  
8     moved from STRATCOM to SOCOM, and we had the SOCOM commander  
9     testify here recently. You talk about the whole-of-  
10    government approach. Again, I think having your expertise  
11    and your officials who know a lot about the technical  
12    aspects of this is very important.

13           Are you plugged into that mission at all? And if so,  
14    how?

15           General Klotz: Absolutely. We worked very, very  
16    closely before, when it was under U.S. Strategic Command,  
17    and now that it's under SOCOM, we have a full-time liaison  
18    officer -- civilian serving in Tampa. I had a chance to  
19    meet with the deputy commander of SOCOM not long ago. We  
20    participate in a number of training exercises. We  
21    participate in a number of tabletop command-post exercises,  
22    and we train -- without going into too many details, we  
23    train a lot of their people, if they ever got themselves  
24    into a situation where they were confronting a radiological  
25    or a nuclear incident, how to carry out their duties.

1           Senator Sullivan: Great. That's very reassuring to  
2 hear that you're involved.

3           The final question. Admiral Caldwell, your  
4 responsibilities are over something that's incredibly  
5 important, a very strong record, by the way, over decades,  
6 in terms of the nuclear Navy. How do you maintain that  
7 excellence? How do you maintain the discipline to continue  
8 to have that strong record, and what keeps you up at night  
9 when you're thinking about your mission?

10          Admiral Caldwell: Thanks for the question, sir. We do  
11 have a tremendous record. I think that the support of this  
12 subcommittee and the funding, the stable funding that we've  
13 received is essential to our ability to do that. We hire  
14 tremendous folks to work in my organization, and the  
15 technical base that is supported by our funding -- that's  
16 our scientists, technologists, and engineers -- is essential  
17 to my ability to oversee and ensure the safe, effective  
18 operation of nuclear propulsion plants.

19          Part of our success, a strong part of our success is  
20 the culture that Admiral Rickover instilled in the program  
21 that we still talk about today, this culture of excellence,  
22 the self-critical nature, the stinging into the details, the  
23 ownership. These are just some of the tenets that make us  
24 successful.

25          What keeps me up at night is continuing that record of

1 excellence. Right now I'm laser-focused on executing the  
2 three major programs that are funded by this subcommittee.  
3 That's a lot of work to keep that going. And I also am  
4 laser-focused on ensuring that the operating fleet is still  
5 operated to the high standards to meet what the Navy needs  
6 and also preserve this great record of performance.

7 Senator Sullivan: Great. Thank you.

8 Thank you, Madam Chair.

9 Senator Fischer: Thank you, Senator Sullivan.

10 The committee will stand in recess until we are able to  
11 reconvene after the next vote. Thank you.

12 [Recess.]

13 Senator Fischer: Thank you all for your patience. The  
14 committee hearing will reconvene at this point. Thank you.

15 And I would ask, next in line is Senator Heinrich.

16 Senator Heinrich: Thank you, Chairwoman Fischer. I  
17 want to actually thank the Chair and the Ranking Member for  
18 bringing up with General Klotz the incredible importance of  
19 investing in the plutonium capability and the trusted  
20 microelectronics at the Mesa facility, and I would just add  
21 to that the importance, not only from a physical investment  
22 point of view but the incredible importance of the  
23 intellectual capacity that we have at those two facilities.

24 General Klotz, you mentioned the potential for talk of  
25 the whole-of-government approach, and I would just, with my

1 two cents, proceed cautiously, because first and foremost we  
2 need to make sure we get this right for NNSA's requirements  
3 and needs, and those can be very different from other U.S.  
4 agencies.

5 Ms. Cange, I wanted to ask you, I was really pleased to  
6 be at the WIPP facility in January when waste disposal  
7 operations were re-started. Going forward, what are some of  
8 the key milestones and the timeline for restoration for full  
9 operation at the WIPP facility?

10 Ms. Cange: Thank you. We, too, were very excited with  
11 the resumption of activities and operations at WIPP. As you  
12 may know, we started shipping waste from the generator sites  
13 to WIPP for disposal beginning in April of this year, and  
14 when we first started we were limited to two shipments per  
15 week. We have shipped waste from Idaho, from Savannah  
16 River, and also from Waste Control Specialist facility in  
17 Texas, and we are now up to three shipments per week.

18 We will be adding shipments from the Oak Ridge site,  
19 and also the Los Alamos site, later this year. So there are  
20 plans underway to increase the number of generator sites  
21 sending the waste, and we do plan to get up to four  
22 shipments per week by the end of 2017.

23 Of course, one of our challenges with being able to  
24 resume full operations or the level of operations prior to  
25 the shutdown is the ventilation system. As I'm sure you

1 know, we have an important capital asset project underway  
2 for the installation of a new ventilation system and an  
3 exhaust shaft. We are at the 90 percent design review stage  
4 for those new facilities, and our current plan is to  
5 complete construction and have the facilities operational in  
6 the 2021 timeframe. It's at that point that we will be able  
7 to resume full operations and go back to what we were, which  
8 was approximately 17 shipments per week.

9 Senator Heinrich: Great. So, Ms. Cange, in addition  
10 to the operating funds for WIPP and, as you mentioned, the  
11 investments and the construction of the new exhaust shaft  
12 and the ventilation system, one of my concerns is that WIPP  
13 is reporting a backlog of about \$25 million in Fiscal Year  
14 2018 for really critical upgrades for key fire safety  
15 systems, for instrumentation, for infrastructure.

16 Your budget request of \$323 for Fiscal Year 2018 is  
17 certainly below what I think WIPP needs at this point, and I  
18 just want you to know that I'll be working to increase the  
19 funding for WIPP when we mark up the Fiscal Year 2018 NDAA.

20 General Klotz, I have a question for you that relates  
21 to recruiting, and we've talked a fair amount about some of  
22 the impediments that we have in recruiting at our NNSA labs.  
23 Both Sandia and Los Alamos labs are actively recruiting new  
24 employees to replace a growing rate of staff retirements,  
25 and one of the barriers to hiring these employees that I

1 hear about is the long timeframe that it takes to obtain  
2 security clearances for new hires. Some of these backlogs,  
3 the backlogs for clearances at each lab, is up to 1,000 new  
4 hires and time delays of sometimes over a year.

5 Do you have any suggestions on what we can do to reduce  
6 that backlog at this point?

7 General Klotz: Thank you, Senator. I, too, share your  
8 frustration on that, and it is an enormous impediment in  
9 terms of hiring people, or once you hire them actually  
10 putting them to work for the tasks that you've hired them to  
11 do. I'm sad to report that it's not getting any faster in  
12 terms of the normal processing of security clearances. At  
13 least that's been our experience.

14 Now, there are a number of things we are doing. We are  
15 trying to lean very far forward in the granting of interim  
16 clearances for those people who have in their background  
17 check, the background check doesn't indicate anything that  
18 would ultimately be untoward as far as the award, the  
19 granting of a security clearance.

20 The other thing I've seen going on at both our national  
21 laboratories and our production plants, which I commend them  
22 on, is going ahead and bringing people on and then starting  
23 the process of doing work that is unclassified. For  
24 instance, I was at Kansas City plant not long ago where they  
25 had sort of a basic course on how you do soldering and

1 putting together the various types of components which they  
2 produce there at Kansas City, but doing it in an  
3 unclassified setting, so that when their clearances come  
4 through they're able to move over. And as you well know,  
5 Senator, at our laboratories, including Sandia and Los  
6 Alamos, one of the things that we do is we bring in a lot of  
7 postdocs and interns, other people that we want to work  
8 there, put them to work on unclassified projects, a lot of  
9 them funded by research and development funds, and then as  
10 they get their clearances they can move over to jobs that  
11 require those clearances.

12 Senator Heinrich: Would you agree that LDRD is an  
13 absolutely critical component to be able to recruit the  
14 quality of applicants that we need, especially given some of  
15 the older infrastructure, the competition with Silicon  
16 Valley and other issues, and the remoteness of some of these  
17 sites, to the ability to get the best-of-the-best into these  
18 national labs?

19 General Klotz: Absolutely, and I appreciate your  
20 personal support in stressing the importance of LDRD over  
21 these past few years. It's an extraordinarily important way  
22 in which to recruit the best and brightest out of our  
23 graduate school programs to the laboratories and to give  
24 them some challenging science work to do, work that they can  
25 publish because it's unclassified for the most part, and

1 then allow them to build up their credibility among their  
2 peers.

3 It also, by the way, has resulted in some fairly  
4 important scientific and engineering outcomes which do have  
5 some direct correlation to the work that we do either in the  
6 nuclear weapons enterprise or for the other customers that  
7 the labs have, whether it's other government agencies or  
8 whether it's technology which can be transferred to the  
9 commercial sector.

10 Senator Heinrich: Madam Chair, I apologize for going  
11 over my time.

12 Senator Fischer: Thank you, Senator.

13 Senator Peters?

14 Senator Peters: Thank you, Madam Chair.

15 And to our witnesses here today, I appreciate your  
16 testimony a great deal. Thank you for taking the time to be  
17 here.

18 It's my belief that the continued improvement of  
19 nuclear detection technology is an often overlooked  
20 component of the international non-proliferation regime.  
21 The United States and our allies, particularly at the  
22 International Atomic Energy Agency, of course used radiation  
23 detectors, seismographs and many other technologies to  
24 ensure that countries are abiding by their commitments under  
25 treaties, such as the Non-Proliferation Treaty, and are not

1 secretly building a nuclear weapon.

2           The Iran nuclear deal depends in part on the  
3 application of this technology, such as devices that can  
4 measure and transmit in real time the enrichment level of  
5 uranium and centrifuges or detectors that can identify  
6 nuclear isotopes in particles about one-tenth of the width  
7 of a hair, which is amazing. And I believe that it's  
8 critical to develop next-generation non-proliferation  
9 technology to sustain international norms.

10           This is especially critical during the years afforded  
11 by the Iran nuclear deal so that when some of its components  
12 expire, the world standard for non-proliferation can be  
13 raised, hopefully during these next few years.

14           The NNSA's defense nuclear non-proliferation research  
15 and development program supports research programs to  
16 develop this next generation of nuclear non-proliferation  
17 technology, and a prime example that I'm very proud of is  
18 research conducted by the Consortium for Verification  
19 Technology which is based at the University of Michigan,  
20 which includes universities and national laboratories from  
21 across the nation.

22           So, General, in your view, how important is new nuclear  
23 detection technology for future non-proliferation efforts?

24           General Klotz: Thank you, Senator, for that strong  
25 endorsement of a very, very important line of work that we

1 do within the National Nuclear Security Administration.

2 Dave Huizenga is here, who is the Acting Deputy

3 Administrator for Defense Nuclear Non-Proliferation. I'm

4 sure he was glad to hear that as well.

5 We work on a number of different fronts to improve the

6 detection capability for both the U.S. customers, as well as

7 our international partners, and it's not just in the NNSA

8 labs. It's also in the academic institutions, as you so

9 rightly point out, as well as the other Department of Energy

10 labs.

11 So some of the things we're doing is we're looking at

12 developing fast-growing large crystals that are an important

13 part of detectors, pushing the limits of chemistry in the

14 process of doing that. We're also looking to make detection

15 equipment less expensive and less bulky and cumbersome so

16 that inspectors, whether they're U.S. inspectors or IAEA

17 inspectors, will be able to carry more with them to detect

18 various radiation sources.

19 Senator Peters: Well, the Iran nuclear deal is

20 providing -- well, it's now less than 15 years when many of

21 the requirements disappear. Where do you see this

22 technology going in the next 15 years? What can we expect

23 as far as advancements that can help us in hopefully

24 continuing to contain any kind of nuclear program there, and

25 how will you contribute to this effort, or how will the

1 organization contribute to the effort?

2 General Klotz: Well, we'll continue to push the edge  
3 of the envelope as far as detection capability is concerned.  
4 You already mentioned one of the major contributions that  
5 the National Nuclear Security enterprise and our lab  
6 enterprise was able to produce. We actually refer to it as  
7 the online enrichment monitor, the OLEM, which can fit  
8 around a pipe without cutting into the pipe and measure the  
9 enrichment of the uranium gas that's actually flowing  
10 through it. That was a huge development and one that we  
11 passed on to the International Atomic Energy Agency for  
12 their use.

13 But as more nations express interest in and pursue  
14 commercial nuclear power as a means of meeting their energy  
15 goals for the future, the demands placed upon the IAEA to be  
16 able to carry out its safeguard and safety mission is only  
17 going to increase. I think we'll have a lot of work ahead  
18 of us to make sure they have not only the diagnostic tools  
19 they need to do this but also the protocols that they follow  
20 in forcing compliance with the safeguard agreements under  
21 the Nuclear Non-Proliferation Treaty.

22 Senator Peters: In addition to my service here on the  
23 Armed Services Committee, I'm also a member of the Homeland  
24 Security Committee, and the Department of Homeland Security  
25 also is engaged in this research effort, and it also has a

1 number of programs related to it.

2 General Klotz, as well as Mr. Trimble, could you  
3 perhaps talk a little bit about whether or not there is  
4 overlap between what you're doing, what the Department of  
5 Homeland Security is doing, and what sort of coordination is  
6 going on between these entities?

7 General Klotz: We are working very, very closely  
8 together, both at sort of the working group level, the  
9 action officer level, particularly on areas related to  
10 nuclear detection and also responding to a nuclear or  
11 radiological event that might take place here in the United  
12 States.

13 In terms of duplication, I personally don't think there  
14 is much. We made some decisions in the past where we  
15 decided, for instance, various capabilities would reside  
16 within the Department of Homeland Security and various  
17 things would continue to reside in the Department of Energy.  
18 And again, we also work together through a thing known as  
19 the Mission Executive Council, which meets at my level as  
20 well as my counterparts in the Department of Homeland  
21 Security and other government agencies to work out those  
22 kinds of lines of business that we have.

23 Senator Peters: Director Trimble?

24 Mr. Trimble: In regards to the research and  
25 development programs, that's not an area that we've dived

1 into in terms of the overall duplication.

2 Senator Peters: Great. Thank you for your testimony.  
3 I appreciate it.

4 Senator Fischer: Thank you.

5 Senator Warren?

6 Senator Warren: Thank you, Madam Chair.

7 And thank you all for being here today.

8 Despite our differences, which are many, Russia and the  
9 United States both want to prevent the spread of nuclear  
10 weapons, and we've had some real success on that front in  
11 the last 30 years. After the fall of the Soviet Union we  
12 worked together to remove nuclear material from Central and  
13 Eastern Europe, and over time we have down-blended over 500  
14 tons of highly enriched uranium from Soviet-era nuclear  
15 weapons.

16 But that's changed. In 2014, the Russians terminated  
17 much of our bilateral nuclear security cooperation. In  
18 2016, they refused to attend the 2016 Nuclear Security  
19 Summit, and later in 2016 they pulled out of a 16-year-old  
20 agreement to destroy 34 tons of plutonium, which is enough  
21 to make about 17,000 nuclear weapons.

22 So, General Klotz, in light of shrinking U.S.-Russia  
23 cooperation, what is NNSA's strategy to ensure that Russia's  
24 large nuclear complex and stockpiles of nuclear material  
25 remains secure? What's the plan now?

1           General Klotz: I think, Senator, you've laid it out  
2 very well, the history of this, with the Nunn-Lugar and the  
3 other work that DOE did separate from Nunn-Lugar. I happen  
4 to have been serving in Moscow from 1999 to 2001 in our  
5 embassy there and saw firsthand the work that was being done  
6 by both Department of Defense and Department of Energy in  
7 helping secure Russian nuclear facilities, doing work to get  
8 control of all the materials there, and that was very, very  
9 productive work. We established a lot of good working  
10 relationships at the technical level, scientist to  
11 scientist, engineer to engineer. But it did come to a halt,  
12 and it came to a halt I think for two reasons.

13           One, the Russians felt that, given the turnaround in  
14 their economic situation, that they no longer needed to be  
15 in a donor-recipient relationship as far as aid to help  
16 secure their nuclear facilities. And then, of course, there  
17 were all the differences in our relationship that have  
18 developed as a result of the invasion of Crimea, the  
19 annexation of Crimea, and so on.

20           So, the way in which we continue to cooperate is we are  
21 not doing work inside Russia other than cleaning up a couple  
22 of contracts that had already been in place. We are  
23 prohibited by statute from entering into any new contracts  
24 with Russia, assuming they even want to at this stage, which  
25 they don't. So we're left with working with the Russians,

1 and we continue to work with the Russians on what we would  
2 refer to as third-party efforts; for instance, repatriating  
3 Russian-origin fuel from other countries back to Russia. We  
4 have just recently done that with Russian-origin highly  
5 enriched uranium in Kazakhstan.

6 So we're looking for opportunities to do that. I would  
7 suggest if there ever is a change in our relationship at the  
8 higher political level, it strikes us that this is a natural  
9 place for cooperation to develop, resume and develop,  
10 because what we are talking about, again, as I said earlier,  
11 scientist to scientist, technician to technician.

12 Senator Warren: Right.

13 General Klotz: Largely divorced from the larger,  
14 higher policy issues.

15 Senator Warren: That's very worrisome, where we stand  
16 right now.

17 Let me ask you another part of this. Since the 1990s,  
18 the U.S. has spent billions of dollars to build nuclear  
19 infrastructure on Russian territory for things like training  
20 centers and sensors and nuclear safeguards and other  
21 technology. And now that Russia is not cooperating in these  
22 areas that we talked about, how is NNSA verifying that  
23 Russia is maintaining this infrastructure, and how do we  
24 make sure that this investment is not wasted?

25 General Klotz: That's a very good question, and I

1 probably will need to get back to you on the details. When  
2 we were actively engaged in cooperation with Russia on  
3 nuclear security within Russian borders, our people traveled  
4 there quite extensively to do the same sort of oversight we  
5 do here in the United States with our laboratories and  
6 production facilities to make sure that the contracts and  
7 the assistance we were providing was being used for the  
8 purpose for which it was intended.

9       Senator Warren: You know, the way I keep looking at  
10 this, we have a lot of problems, obviously, with Russia, and  
11 we need a very strong response to their interference in  
12 Ukraine, what they're doing in Syria, the attack on  
13 democratic electoral systems here in the United States and  
14 around the globe, but we don't have to agree on everything  
15 to agree that nuclear proliferation is bad and that we want  
16 to work together to stop it. So I appreciate your efforts  
17 on this.

18       If I can, in my remaining time, I have one other  
19 question I want to ask you about. Among your other  
20 responsibilities, General Klotz, you also oversee some of  
21 the world's most powerful supercomputers, including the  
22 three national ones here -- Los Alamos, Sandia, and Lawrence  
23 Livermore. We use these powerful supercomputers for models  
24 and simulations, obviously for our nuclear weapons  
25 stockpile, but we also use them for physics research and

1 climate change and biological systems and weather  
2 forecasting. They're important for lots of things, and this  
3 has always been an area of national excellence for the  
4 United States.

5 In recent years, however, China seems to be out-pacing  
6 us. Currently, China has the number-one and number-two most  
7 powerful supercomputers in the world.

8 So, General Klotz, in the little time I have left, can  
9 I just ask you to say something about is the United States  
10 losing ground in supercomputing; and if so, should we be  
11 concerned about that?

12 General Klotz: Senator, I think we should be concerned  
13 about it, but not just to have the fastest, best computer,  
14 although I'm a very competitive person, so that appeals to  
15 me.

16 Senator Warren: Good.

17 General Klotz: But we need to develop the computing  
18 capabilities in order to meet the requirements we have to do  
19 the modeling simulation that you talked about to maintain a  
20 stockpile that is safe, secure, and effective.

21 If you'll indulge me for just a minute -- I realize  
22 time is running out. Indulge me just for a minute. The  
23 advances in high-performance computing in the United States  
24 were pioneered by the Atomic Energy Commission and the  
25 Manhattan Project, working with academic institutions and

1 industry across the United States, because we've always had  
2 this demand for the ability to process large amounts of  
3 data, and we continue to advance the frontiers. We just put  
4 in a new computer at Los Alamos, Trinity. Next year we'll  
5 put in a new computing platform at Lawrence Livermore  
6 National Laboratory called Sierra, and we are jointly  
7 embarked upon what we refer to as an exo-scale computing  
8 initiative with DOE's Office of Science to get us to the  
9 level of exo-scale, which is 10-to-the-18th, a quintillion  
10 flops of capability to do the 3D high-fidelity simulations  
11 we need to do in the future.

12 So in NNSA alone we have, basically, last year in the  
13 omnibus we had \$95 million going to develop the process, and  
14 we're asking for \$158 million in the next. So that shows  
15 you, I think, the commitment in the Department of Energy,  
16 the commitment of NNSA to advance our capabilities in this  
17 particular area. This money is not going to buy the  
18 platform. Industry will buy the platform. We have to make  
19 sure that whatever industry develops, we will be able to run  
20 the kind of codes that we need to on the architecture they  
21 have, whether it's for the weapons program or the other  
22 lines of research, weather and biological, that you rightly  
23 pointed to.

24 Senator Warren: Thank you very much. I'm glad to hear  
25 that this is very much a priority for you. I'm a strong

1 supporter of investments in this area. They will pay  
2 dividends for the future, not only for our nuclear  
3 enterprise but for all of our scientific research. So  
4 please count on me as an ally on this.

5 General Klotz: Thank you, Senator.

6 Senator Warren: Thank you.

7 Thank you, Madam Chair.

8 Senator Fischer: Thank you, Senator.

9 If I could follow up a little bit with Senator Warren's  
10 questioning about Russia, you made the comment, General,  
11 that we are not actively engaged within Russia's borders  
12 right now. Can you tell me if Russia is cooperating with  
13 your efforts to secure Russian material in foreign  
14 countries?

15 General Klotz: Yes.

16 Senator Fischer: And Russia's argument at the time, in  
17 2014, was that it didn't need the U.S. assistance to secure  
18 the material. You referenced that their economy had turned  
19 around and they felt that way. What's your assessment of  
20 that claim?

21 General Klotz: I do think -- my personal assessment of  
22 that claim is they have, in fact, improved significantly in  
23 terms of security of both military and domestic radiation  
24 and sources of nuclear material. But we continue to worry,  
25 and I would add that there are still things that could be

1 done. We would probably have to discuss the specifics of  
2 that elsewhere and the basis of our worry. But all  
3 countries, including the United States, need to continue to  
4 focus on safety and security of these special materials.  
5 It's a journey, it's not a destination, and there is a lot  
6 of work that needs to be done everywhere, including inside  
7 Russia.

8 Senator Fischer: So in a classified setting we need to  
9 discuss --

10 General Klotz: Yes, yes.

11 Senator Fischer: -- since cooperation ceased, where  
12 they are on that.

13 General Klotz: Yes, ma'am.

14 Senator Fischer: Thank you.

15 Also, back to my first line of questioning. When we  
16 look across the list on NNSA's construction projects, it  
17 looks like the plutonium project at Los Alamos is the only  
18 one that Congress appropriates at the sub-project level.  
19 You referenced that. Do you believe that that's helpful or  
20 hurtful?

21 General Klotz: Our druthers, our preference would be  
22 that we be appropriated not at the sub-project level, and  
23 let me tell you why. For instance, with the uranium  
24 processing facility, you appropriated at the level of the  
25 uranium processing facility. We have a number of sub-

1 projects under that. What that does is it gives us the  
2 flexibility that if we achieve some savings, which we have  
3 in the uranium processing facility sub-projects, we can move  
4 that money to other areas of the overall project that need  
5 that funding at that particular time. And now, within the  
6 CMMR program, we would essentially, if we found that we had  
7 saved some money in some area or we had a higher priority in  
8 another area, we would have to come to the four committees  
9 to ask for reprogramming. And with all the work that those  
10 committee staff have to do, it just takes time to get that  
11 through, and we may be late or we may be pushing some work  
12 to the right that will drive up cost.

13 I think there's ample opportunity on the part of  
14 committee staff and for members to exercise oversight. We  
15 send up the project data sheets. We come up and routinely  
16 brief staff and members on the work that we're doing there.  
17 We put out a strategic stockpile management plan every year,  
18 and we have these budgets, including the congressional  
19 justifications that go in there that tell you exactly what  
20 we're doing, almost in real time.

21 Senator Fischer: Thank you, General.

22 Senator Donnelly?

23 Senator Donnelly: Thank you, Madam Chair.

24 Admiral Caldwell, I understand the electric drive for  
25 the Ohio replacement is behind schedule, as we had talked

1 about. Can you explain what happened and what's being done  
2 to get us squared away, and the impact it will have on your  
3 integration to the Ohio replacement submarine?

4 Admiral Caldwell: Yes, sir. In February of this year,  
5 we discovered that we had a manufacturing error on a pre-  
6 production motor. It's a prototypical motor. That  
7 prototypical motor is designed to go into a test facility  
8 with other pre-production components to prove out the  
9 integration of those components, and then what we learn  
10 there will go into the final production motor that will go  
11 onto the first ship.

12 What we discovered was that the prime contractor's  
13 vendor did not properly flow down some requirements for the  
14 motor, and as a result some portions of the motor were not  
15 properly insulated. The impact is that we will have to  
16 extend our test program. The subcontractor is going to make  
17 this right. They're going to tear down the motor and  
18 rebuild it with the proper insulation. They're also  
19 procuring a second pre-production motor that will give us  
20 two paths to get to our integrated testing.

21 That all said, we built plenty of margin into the  
22 schedule because there's so much riding on getting electric  
23 drive correct. And even with this nine-month extension of  
24 our integrated testing, we will still meet the required in-  
25 yard date for the final production motor.

1           Additionally, we've taken action to ensure that the  
2 design specifications are flowing to the prime and  
3 subcontractor and sub-tier vendor appropriately, and there's  
4 been an increase in oversight at all levels.

5           I'd also like to make sure that I point out that the  
6 money to support this effort is on the DON side of my budget  
7 and not the DOE side of the budget.

8           But to reiterate, we are still able to meet our  
9 required in-yard date for the final production motor.

10          Senator Donnelly: Thank you.

11          Thank you, Madam Chair.

12          Senator Fischer: Thank you, Senator Donnelly.

13          I would like to thank all the members of the panel for  
14 being here today. We always appreciate the information that  
15 you provide to us.

16          If any members have any written questions for you, I  
17 would ask that you respond in a timely manner.

18          And with that, I will adjourn the subcommittee. We are  
19 adjourned.

20          [Whereupon, at 4:13 p.m., the hearing was adjourned.]

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**Statement of Lt. Gen. Frank G. Klotz, USAF (Ret)  
Administrator  
National Nuclear Security Administration  
U.S. Department of Energy  
on the  
Fiscal Year 2018 President's Budget Request  
Before the  
Subcommittee on Strategic Forces  
Senate Committee on Armed Services**

**May 24, 2017**

Chairwoman Fischer, Ranking Member Donnelly, and Members of the Subcommittee, thank you for the opportunity to present the President's Fiscal Year (FY) 2018 budget request for the Department of Energy's (DOE) National Nuclear Security Administration (NNSA). The Committee's strong support for the nuclear security mission and for the people and organizations that are responsible for executing it is deeply appreciated.

The President's FY 2018 budget request for NNSA is \$13.9 billion, an increase of \$1.0 billion, or 7.8% over the FY 2017 Omnibus level. The request represents approximately 50% of DOE's total budget and 68% of DOE's 050 budget.

NNSA's diverse missions are critical to the national security of the United States: maintaining the safety, security, reliability, and effectiveness of the nuclear weapons stockpile; reducing the threat of nuclear proliferation and nuclear terrorism around the world; and providing nuclear propulsion for the U.S. Navy's fleet of aircraft carriers and submarines. This budget request demonstrates the Administration's strong support for NNSA and is vital to ensuring that U.S. nuclear forces are modern, robust, flexible, resilient, ready, and appropriately tailored to deter 21st-century threats and reassure America's allies.

NNSA's activities are accomplished through the expertise, innovative spirit, and hard work of both its federal and its Management and Operating (M&O) contractor employees. NNSA must continue to support these highly-talented, dedicated men and women as they carry out complex and challenging responsibilities. In particular, it is imperative that NNSA modernize its scientific, technical, and engineering capabilities, as well as its infrastructure, in order to provide a safe, modern, and more efficient workspace for its workforce. In doing so, NNSA is mindful of its obligation to continually improve its business practices and to be responsible stewards of the resources that Congress and the American people have entrusted to the agency.

The FY 2018 budget request also reflects the close working partnership between NNSA, the Department of Defense (DoD), the Department of Homeland Security (DHS), the State Department, the Intelligence Community, and other federal departments and agencies. NNSA works closely with DoD to meet military requirements, support the Nation's nuclear deterrent,

and modernize the nuclear security enterprise. NNSA also collaborates with a range of federal agencies to prevent, counter, and respond to nuclear proliferation and nuclear terrorism.

### **Weapons Activities Appropriation**

For the Weapons Activities account, the FY 2018 budget request is \$10.2 billion, an increase of nearly \$1 billion, or 10.8% over the FY 2017 Omnibus level. Programs funded in this account support the Nation's current and future defense posture and its attendant nationwide infrastructure of science, technology, and engineering capabilities. Weapons Activities provide for the maintenance and refurbishment of nuclear weapons to maintain their safety, security, and reliability; investments in scientific, engineering, and manufacturing capabilities to certify the enduring nuclear weapons stockpile; and the fabrication of nuclear weapon components. Weapons Activities also includes investments to make the NNSA nuclear complex more cost effective and more responsive to unanticipated challenges or emerging threats.

### **Maintaining the Stockpile**

This year, the work of the science-based Stockpile Stewardship Program (SSP) allowed the Secretaries of Energy and Defense to certify to the President for the 21<sup>st</sup> consecutive year that the U.S. nuclear weapons stockpile remains safe, secure, and reliable without the need for nuclear explosive testing. This remarkable scientific achievement is made possible each year by investments in state-of-the-art diagnostic tools, high performance computing platforms, modern facilities, and most importantly by NNSA's world-class scientists, engineers, and technicians.

For Directed Stockpile Work (DSW), the FY 2018 budget request is \$4.0 billion, an increase of \$669 million, or 20.2% over the FY 2017 Omnibus level.

The major warhead Life Extension Programs (LEPs) are a fundamental part of this account:

- **W76-1 LEP:** The \$224 million requested for the W76-1 LEP directly supports the sea-based leg of the nuclear triad and will keep the LEP on schedule and on budget to complete production in FY 2019.
- **B61-12 LEP:** NNSA continues to make progress on the B61-12 LEP, which will consolidate four variants of the B61 gravity bomb and improve the safety and security of the oldest weapon system in the U.S. nuclear arsenal. In June 2016, NNSA authorized the program to transition into the Production Engineering Phase (Phase 6.4). With the \$788.6 million requested, NNSA will remain on schedule to deliver the First Production Unit (FPU) of the B61-12 in FY 2020. NNSA is responsible for refurbishing the nuclear explosives package and updating the electronics for this weapon, while the Air Force will provide the tail kit assembly under a separate acquisition program. When fielded, the B61-12 gravity bomb will support both Air Force long-range nuclear-capable bombers and dual-

capable fighter aircraft, bolstering central deterrence for the United States while also providing extended deterrence to America's allies and partners.

- **W88 Alteration (Alt) 370 Program:** In February 2017, NNSA began the Production Engineering Phase (Phase 6.4) for the W88 Alt 370 Program, including conventional high explosives refresh activities. The budget request for this program, which also supports the sea-based leg of the nuclear triad, includes \$332 million in FY 2018, an increase of \$51 million, or 18.2% over the FY 2017 Omnibus level, to support the scheduled FPU in FY 2020.
- **W80-4 LEP:** The FY 2018 budget request is \$399 million, an increase of \$179 million, or 81.2% over the FY 2017 Omnibus level. This funding supports a significant increase in program activity through the Design Definition and Cost Study Phase (Phase 6.2A), driving toward a FY 2025 FPU in support of the Air Force's Long Range Stand-Off (LRSO) cruise missile program.

Also within DSW, the FY 2018 budget request includes \$1.5 billion for Stockpile Systems and Stockpile Services. These programs sustain the stockpile in accordance with the Nuclear Weapon Stockpile Plan by producing and replacing limited-life components such as neutron generators and gas transfer systems; conducting maintenance, surveillance, and evaluations to assess weapon reliability; detecting and anticipating potential weapon issues; and compiling and analyzing information during the Annual Assessment process.

NNSA continues to make progress on the Joint Technology Demonstrator (JTD) program, a strategic collaboration between the United States and the United Kingdom under the Mutual Defense Agreement. This program is intended to reduce technological risk and provide relevant data for future program activities. JTD's focus is on technologies and process improvements that can improve weapon affordability and enhance weapon safety and security.

Within DSW, the FY 2018 budget request also includes \$695 million for Strategic Materials. This funding is necessary to maintain NNSA's ability to produce the nuclear and other strategic materials associated with nuclear weapons as well as refurbish and manufacture components made from these materials. The program includes Uranium Sustainment, Plutonium Sustainment, Tritium Sustainment, Domestic Uranium Enrichment (DUE), and other strategic materials, such as lithium.

Funding for Uranium Sustainment will permit operations with enriched uranium in Building 9212, a Manhattan Project-era production facility at the Y-12 National Security Complex in Oak Ridge, Tennessee, to end in FY 2025, and allow the bulk of this obsolete building to shut down.

Plutonium Sustainment funds the replacement and refurbishment of equipment and critical skills needed to meet the pit production requirements. Increases are included to fabricate several W87 developmental pits. Investments to replace pit production equipment which has

reached the end of its useful life and install equipment to increase production capacity are also continued.

Tritium Sustainment ensures the Nation's capacity to provide the tritium for national security requirements by irradiating Tritium Producing Burnable Absorber Rods in designated Tennessee Valley Authority nuclear power plants and by recovering and recycling tritium from gas transfer systems returned from the stockpile.

The DUE program continues its efforts to ensure that NNSA has the necessary supplies of enriched uranium for a variety of national security needs. Funding increases are included in this year's request to begin down-blending available stocks of unobligated highly enriched uranium (HEU) for use in tritium production, which delays the need date for a DUE capability until at least 2038-2041.

The FY 2018 budget request also includes \$52 million for Weapons Dismantlement and Disposition to allow NNSA to remain on track with the goal of dismantling all weapons retired prior to FY 2009 by the end of FY 2022.

For Research, Development, Test, and Evaluation (RDT&E), the FY 2018 budget request is \$2 billion, an increase of \$186 million or 10.1% over the FY 2017 Omnibus level.

Increases for the Science Program (\$487.5 million, an increase of \$51 million) provide additional funding for the Advanced Sources and Detectors Major Item of Equipment in support of the Enhanced Capabilities for Subcritical Experiments (ECSE) effort.

The Engineering Program (\$193.1 million, an increase of \$61 million) sustains NNSA's trusted microsystems capability and further develops the Stockpile Responsiveness Program (SRP). NNSA is requesting \$40 million in FY 2018 for SRP to identify, sustain, enhance, integrate, and continually exercise the capabilities required to conceptualize, study, design, develop, engineer, certify, produce, and deploy nuclear weapons. These activities are necessary to ensure the U.S. nuclear deterrent remains safe, secure, reliable, credible, and responsive. The funding will support the creation of design study teams to explore responsiveness concepts as well as development of capabilities for accelerating the qualification and production cycle.

The Inertial Confinement Fusion Ignition and High Yield Program has spearheaded ongoing improvements in management and operational efficiencies at NNSA's major high energy density (HED) facilities, including the National Ignition Facility (NIF) at LLNL in California, the Z-Machine at Sandia National Laboratories in New Mexico, and the OMEGA laser facility at the University of Rochester in New York. In FY 2016, NIF exceeded the goal of 400 data-acquiring shots (417), more than double the number of shots executed in FY 2014 (191) in support of the SSP. The improved shot rates have accelerated progress towards the achievement and application of multi-megajoule fusion yields, investigating material behaviors in conditions presently inaccessible via other experimental techniques, and improving the predictive

capability of NNSA's science and engineering models in high-pressure, high-energy, high-density regimes.

The RDT&E request for FY 2018 includes \$734 million for the Advanced Simulation and Computing (ASC) Program. NNSA is taking major steps in high performance computing (HPC) to deliver on its missions by deploying increasingly powerful computational capabilities to both Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL). In the summer of 2017 – Trinity – NNSA's next generation high performance computer, will become fully available for classified use at LANL. This computer will be about 30 times more powerful than the Cielo super computer it is replacing. The Sierra HPC system will be deployed at LLNL starting this year; it is projected to provide four to six times the sustained performance of LLNL's current HPC system, Sequoia.

The RDT&E request also increases NNSA's contribution to the Exascale Computing Initiative (ECI) from \$95 million in FY 2017 to \$161 million in the FY 2018 request. The ECI is a collaboration with DOE's Office of Science to develop the technology needed for exascale-class high performance computing. The increased funding will provide for NNSA-specific application development, and improve software and hardware technologies for exascale computing in order to meet NNSA's needs for future assessments, LEPs, and stockpile stewardship. Specifically, exascale computing will provide capabilities to improve weapon performance simulation tools and techniques; evaluate the safety, security, and effectiveness of the current stockpile; and provide support to certify potential advanced surety features for the future stockpile.

NNSA's Secure Transportation Asset (STA) program provides safe, secure movement of nuclear weapons, special nuclear material (SNM), and weapon components to meet projected DOE, DoD, and other customer requirements. The Office of Secure Transportation (OST) has an elite workforce performing sensitive and demanding work; OST agents are among the most highly trained national security personnel operating within the United States. Since FY 2012, STA has repeatedly been funded below the Administration's budget requests. This trend increases risks and possible production delays to the Mobile Guardian Transporter (MGT) and adversely affects OST's ability to recruit and retain agents. The FY 2018 budget request of \$325.1 million includes an increase of \$76 million or 30.6% over the FY 2017 Omnibus level to continue asset modernization and workforce capability initiatives. These initiatives include: 1) restoration of federal agent strength levels to meet the goal of 370 agents; 2) the Safeguards Transporter (SGT) Risk Reduction Initiatives to manage the SGT beyond its design life; 3) procurement of long-lead parts and materials for the two full scale MGT prototype systems; and 4) deferred facilities maintenance and minor construction projects at multiple sites.

### **Improving Safety, Operations, and Infrastructure**

NNSA's ability to achieve its vital national security missions is dependent upon safe and reliable infrastructure. If not appropriately addressed, the age and condition of NNSA's infrastructure will put NNSA's missions, the safety of its workers, the public, and the environment at risk.

More than half of NNSA's facilities are over 40 years old, and roughly 30% date back to the Manhattan Project era. The FY 2018 budget request for Infrastructure and Operations is \$2.8 billion, a decrease of \$5 million, or 0.2% below the FY 2017 Omnibus level. The request actually represents an increase of \$195 million (7.5%) after adjusting for the one-time \$200 million Bannister Federal Complex project funded in FY 2017. This funding will help modernize and upgrade antiquated infrastructure and address safety and program risks through strategic investments in general purpose infrastructure and capabilities that directly support NNSA's nuclear weapons and nonproliferation programs.

In August 2016, NNSA broke ground on the Administrative Support Complex at the Pantex nuclear weapons assembly and dismantlement facility in Amarillo, Texas. The site's M&O contractor entered into a lease agreement for a new office building that a private developer is building using third-party financing. This project will allow roughly 1,000 employees to move out of dilapidated, 1950s-era buildings into a modern, energy efficient workspace. It will also eliminate approximately \$20 million in deferred maintenance at the Pantex site and enhance recruitment and retention by improving the quality of the work environment. The project will be completed and staff will move into the new facility, by spring 2018.

The FY 2018 budget request further reduces deferred maintenance and supports the execution of new recapitalization projects to improve the condition and extend the design life of structures, capabilities, and systems to meet program demands; decrease overall operating costs; and reduce safety, security, environmental, and program risk. The request also supports general purpose infrastructure and program-specific capabilities through Line Item Construction projects. These projects include the Uranium Processing Facility (UPF) at Y-12, the Chemistry and Metallurgy Research Replacement (CMRR) project at LANL, and the Albuquerque Complex Project.

One of the most worrisome of the NNSA infrastructure challenges is the excess facilities that pose risks to NNSA's workers, the environment, and the nuclear security mission. As of the end of FY 2016, NNSA had 417 excess facilities, 79 of which were identified as high-risk excess facilities, including 58 at the Kansas City Bannister Federal Complex. Many of these facilities will ultimately be transferred to the DOE Office of Environmental Management (EM) for disposition, and the EM FY 2018 budget requests \$225 million to address high-risk excess facilities at Y-12 and LLNL. In the interim, NNSA is focusing on reducing the risk where it can. The FY 2018 budget request supports a number of activities related to excess facilities. NNSA benefitted enormously from funding provided by Congress in FY 2017 for the disposition of the Bannister Federal Complex in Kansas City. The disposition project is on track, with final pre-transfer activities occurring now.

The Office of Defense Nuclear Security (DNS) develops and implements security programs to protect sensitive nuclear material (SNM), people, information, and facilities throughout the nuclear security enterprise. The FY 2018 budget request is \$687.0 million, an increase of \$1.5 million, or 0.2% over the FY 2017 Omnibus level that included funding to address immediate infrastructure needs at Pantex and Y-12. The request manages risk among important

competing demands as NNSA continues to face the challenges associated with physical security infrastructure that must be effectively addressed in the coming years. NNSA is finalizing a 10-Year Plan to Recapitalize Physical Security Systems Infrastructure, also known as the 10-Year Plan, which identifies and prioritizes the replacement and refresh of physical security infrastructure across the nuclear security enterprise. Of note, the request includes preliminary planning and conceptual design funds for future projects, as outlined in the 10-Year Plan, to sustain and recapitalize the Perimeter Intrusion Detection and Assessment System (PIDAS) at the Pantex Plant and Y-12.

Information Technology and Cybersecurity enable every facet of the NNSA mission. The FY 2018 budget request is \$186.7 million, an increase of \$10 million, or 5.7% over the FY 2017 Omnibus level. This increase will fund much needed improvement to the Information Technology and Cybersecurity program, including Continuous Diagnostic and Mitigation, Telecommunications Security, infrastructure upgrades for the Enterprise Secure Computing Network (ESN), Public Key Infrastructure (PKI), Energy Sciences Network program, and an increased information technology budget. The cybersecurity program continuously monitors enterprise wireless and security technologies to meet a wide range of security challenges. In FY 2018, NNSA plans to continue the recapitalization of the ESN, modernize the cybersecurity infrastructure, implement the Identity Control and Access Management project at NNSA Headquarters and site elements, and implement all Committee on National Security Systems and PKI capabilities. The requested funding increase will allow NNSA to continue working toward a comprehensive information technology and cybersecurity program to deliver critical information assets securely.

### **Defense Nuclear Nonproliferation Appropriation**

The FY 2018 budget request for the Defense Nuclear Nonproliferation (DNN) account is \$1.8 billion, a level consistent with the FY 2017 Omnibus level. This appropriation covers NNSA's critical and far-reaching nuclear threat reduction activities. DNN addresses the entire nuclear threat spectrum by helping to prevent the acquisition of nuclear weapons or weapon-usable materials, technologies, and expertise; countering efforts to acquire them; and responding to possible nuclear and radiological incidents. The FY 2018 budget request funds two program mission areas under the DNN account: the Defense Nuclear Nonproliferation Program and the Nuclear Counterterrorism and Incident Response (NCTIR) Program.

### **Nonproliferation Efforts**

Working with international partners, the Office of Defense Nuclear Nonproliferation removes or eliminates vulnerable nuclear material; improves global nuclear security through multilateral and bilateral technical exchanges and training workshops; helps prevent the illicit trafficking of nuclear and radiological materials; secures domestic and international civilian buildings containing high-priority radiological material; provides technical reviews of U.S. export license applications; conducts export control training sessions for U.S. enforcement agencies and international partners; strengthens the IAEA's ability to detect and deter nuclear proliferation;

advances U.S. capabilities to monitor arms control treaties and detect foreign nuclear programs; and maintains organizational readiness to respond to and mitigate radiological or nuclear incidents worldwide.

The Material Management and Minimization (M<sup>3</sup>) program provides an integrated approach to addressing the risk posed by nuclear materials. The FY 2018 budget request is \$332.1 million, an increase of \$44 million or, 15.2% over the FY 2017 Omnibus level. The request supports the conversion or shut-down of research reactors and isotope production facilities that use HEU; acceleration of new, non-HEU-based molybdenum-99 production facilities in the United States; the removal and disposal of WUNM; and the completion of the lifecycle cost estimate and schedule for the dilute and dispose option for plutonium disposition.

The Global Material Security (GMS) program works with partner nations to increase the security of vulnerable nuclear and radiological materials and improve their ability to detect, interdict, and investigate illicit trafficking of these materials. The FY 2018 budget request for this program is \$337.1 million, a decrease of \$30 million, or 8.2% below the FY 2017 Omnibus level.

The Nonproliferation and Arms Control (NPAC) program develops and implements programs to strengthen international nuclear safeguards; control the spread of nuclear and dual-use material, equipment, technology and expertise; verify nuclear reductions and compliance with nonproliferation and arms control treaties and agreements; and address other challenges. The FY 2018 budget request for this program is \$129.7 million, an increase of \$5 million, or 4.0% over the FY 2017 Omnibus level. This increase serves to improve the deployment readiness of U.S. nuclear disablement and dismantlement verification teams and to enhance export control dual-use license and interdiction technical reviews.

The DNN Research and Development (DNN R&D) program supports innovative unilateral and multilateral technical capabilities to detect, identify, and characterize foreign nuclear weapons programs, illicit diversion of SNM, and nuclear detonations worldwide. The FY 2018 budget request for this program is \$446.1 million, a decrease of \$23.7 million, or 5.0% below the FY 2017 Omnibus level. The decrease in funding reflects a shift of \$53 million from R&D back to M<sup>3</sup> for the U.S. High Performance Research Reactors Program and is offset by an increase of \$29 million for planned R&D activities.

Nonproliferation Construction consolidates construction costs for DNN projects. The FY 2018 budget request is \$279 million, a decrease of \$56 million, or 16.7% below the FY 2017 Omnibus level. The Administration proposes to terminate the Mixed Oxide Fuel Fabrication (MFFF) project and to pursue the dilute and dispose option to fulfill the United States' commitment to dispose of 34 metric tons of plutonium. If supported by Congress, \$270 million would be used to achieve an orderly and safe closure of the MFFF. The scope and costs will be refined in subsequent budget submissions when the termination plan for the MFFF project is approved. In addition, \$9 million is provided for the Surplus Plutonium Disposition project to support the dilute and dispose strategy.

## **Nuclear Counterterrorism and Counterproliferation**

In FY 2016, the NCTIR Program transitioned to the DNN account from the Weapons Activities account to align all NNSA funding to prevent, counter, and respond to nuclear proliferation and nuclear terrorism under the same appropriations account. The FY 2018 budget request includes \$277.4 million to support the NCTIR Program, an increase of \$5 million, or 2.0% over the FY 2017 Omnibus level. Within NCTIR, NNSA continues to work domestically and internationally to prepare for and improve the Nation's ability to respond to radiological or nuclear incidents.

NNSA's counterterrorism and counterproliferation programs are part of broader U.S. Government efforts to assess the threat of nuclear terrorism and develop technical countermeasures. The scientific knowledge generated under this program ensures NNSA's technical expertise on potential nuclear threat devices, including improvised nuclear devices (INDs), supports and informs U.S. nuclear security policy, and guides nuclear counterterrorism and counterproliferation efforts, including interagency nuclear forensics and contingency planning.

NNSA emergency response teams' current equipment is aging, resulting in increasing maintenance expenses and imposing increased risks to NNSA's ability to perform its emergency response mission. The Radiological Assistance Program (RAP) remains the nation's premier first-response resource to assess a radiological incident and advise decision-makers on the necessary steps to minimize hazards. To ensure that NNSA is able to execute its radiological emergency response mission, RAP's equipment must be recapitalized regularly. NNSA is acquiring state-of-the-art, secure, deployable communications systems that are interoperable with Federal Bureau of Investigation and DoD mission partners, ensuring that decision makers receive real-time technical recommendations to mitigate nuclear terrorist threats.

NNSA recently concluded an Analysis of Alternatives (AoA) on the Aerial Measuring System (AMS) aircraft. The AMS fleet consists of three B200 fixed-wing aircraft with an average age of 33 years and two Bell 412 helicopters with an average age of 24 years. The current aircraft are experiencing reduced mission availability due to increasing unscheduled downtime and maintenance. The AoA determined that NNSA recapitalization of the aging aircraft fleet is necessary in order to provide rapid aerial radiological exposure and contamination information to Federal, State, and local officials following an accident or incident in order to protect the public and first responder's health and safety. NNSA anticipates proposing a two-year replacement schedule starting in FY 2019.

## **Naval Reactors Appropriation**

### **Advancing Naval Nuclear Propulsion**

NNSA provides nuclear propulsion for the U.S. Navy's nuclear-powered fleet, which is critical to the security of the United States and its allies as well as the security of global sea lanes. The

Naval Reactors Program remains at the forefront of technological developments in naval nuclear propulsion. This preeminence derives from advancing new technologies and improvements in naval reactor performance, ensuring a commanding edge in warfighting capabilities.

The Naval Reactors FY 2018 budget request is \$1.48 billion, an increase of \$60 million, or 4.2% above the FY 2017 Omnibus level. In addition to supporting today's operational fleet, the requested funding will enable Naval Reactors to deliver tomorrow's fleet by funding three national priority projects and recruiting and retaining a highly skilled workforce. The projects include: 1) continuing design and development of the reactor plant for the *COLUMBIA*-Class submarine, which will feature a life-of-ship core and electric drive; 2) refueling a Research and Training Reactor in New York to facilitate *COLUMBIA*-Class reactor development efforts and provide 20 more years of live reactor-based training for fleet operators; and 3) building a new spent fuel handling facility in Idaho that will facilitate long term, reliable processing and packaging of spent nuclear fuel from aircraft carriers and submarines.

Naval Reactors has requested funding in FY 2018 to support these projects and fund necessary reactor technology development, equipment, construction, maintenance, and modernization of critical infrastructure and facilities. By employing a small but high-performing technical base, the teams at Bettis Atomic Power Laboratory in Pittsburgh, Knolls Atomic Power Laboratory and Kesselring Site in greater Albany, and the spent nuclear fuel facilities in Idaho can perform the research and development, analysis, engineering and testing needed to support today's fleet at sea and develop future nuclear-powered warships. Importantly, the laboratories perform the technical evaluations that enable Naval Reactors to thoroughly assess emergent issues and deliver timely responses that ensure nuclear safety and maximize operational flexibility.

### **NNSA Federal Salaries and Expenses Appropriation**

The NNSA Federal Salaries and Expenses (FSE) FY 2018 budget request is \$418.6 million, an increase of \$31.5 million, or 8.1% over the FY 2017 Omnibus level. The FY 2018 budget request provides funding for 1,715 full-time equivalents (FTE), which includes a 1.9% cost of living increase, a 5.5% increase for benefit escalation, and other support expenses needed to meet mission requirements. NNSA is actively engaged in hiring to reach that number in a thoughtful and strategic manner. The FY 2018 budget request for 1,715 FTEs is an increase of 25 above the authorized 1,690. Since 2010, NNSA's program funding has increased 28%, while staffing has decreased 17%. In FY 2018, NNSA will continue efforts to meet current and future workforce needs by analyzing job requirements to meet evolving missions, including completion of a study by the Office of Personnel Management in support of the Reform of Government Initiative. Initial results from four program offices and one field office indicate the need for a 20% increase in federal staff.

## **Management & Performance**

Since 2011, NNSA has delivered approximately \$1.4 billion in projects, a significant portion of NNSA's total project portfolio, 8% under original budget. This past February, the High Explosive Pressing Facility at Pantex achieved CD-4 and was completed \$25 million under the approved baseline. NNSA is committed to encouraging competition and increasing the universe of qualified contractors by streamlining its major acquisition processes. NNSA will continue to focus on delivering timely, best-value acquisition solutions for all of its programs and projects, using a tailored approach to contract structures and incentives that is appropriate for the special missions and risks at each site. NNSA's Office of Acquisition and Project Management (APM) is leading continued improvement in contract and project management practices and NNSA's effort to institute rigorous analyses of alternatives; provide clear lines of authority and accountability for program and project managers; improve cost and schedule performance; and ensure Federal Project Directors and Contracting Officers with the appropriate skill mix and professional certifications are managing NNSA's work.

## **Conclusion**

NNSA's diverse missions are crucial to the security of the United States, the defense of its allies and partners, and global stability writ large. The U.S. nuclear deterrent has been the cornerstone of America's national security since the beginning of the nuclear age, and NNSA has unique responsibilities to ensure its continued safety, security, reliability, and effectiveness. Likewise, NNSA's nuclear nonproliferation and nuclear counterterrorism activities are essential to promoting the peaceful use of nuclear energy and preventing malicious use of nuclear and radiological materials around the world. Finally, NNSA's support to the U.S. Navy allows the United States to defend its interests abroad and protect the world's commercial shipping lanes. Each of these critical missions depends upon NNSA's capabilities, facilities, infrastructure, and world-class workforce.

**Written Statement of Susan M. Cange**

**Acting Assistant Secretary for Environmental Management United States Department of  
Energy**

**Before the Subcommittee on Strategic Forces**

**Committee on Armed Services**

**United States Senate**

**May 24, 2017**

Good afternoon Chairwoman Fischer, Ranking Member Donnelly, and Members of the Subcommittee. I am pleased to be here today to represent the Department of Energy's (DOE) Office of Environmental Management (EM). At DOE, the safety of our workforce, the communities and tribal nations that surround our sites, and the environment is the Secretary's highest priority. I would like to provide you with an overview of the EM program, key accomplishments during the past year and planned accomplishments under the President's \$6,508,335,000 Fiscal Year (FY) 2018 budget request.

**Overview of the EM Mission**

EM supports the Department of Energy's priorities to meet the challenges leading the cleanup of legacy waste resulting from the Nation's Manhattan Project and Cold War efforts. The EM program was established in 1989 and is responsible for the cleanup of millions of gallons of liquid radioactive waste, thousands of tons of spent nuclear fuel and special nuclear material, disposition of about two million cubic meters of transuranic and mixed/low-level waste, vast quantities of contaminated soil and water, and deactivation and decommissioning of thousands of excess facilities. This environmental cleanup responsibility results from five decades of nuclear weapons development and production and Government-sponsored nuclear energy research and development. It involves some of the most dangerous materials known to man.

Since 1989, the EM footprint has been reduced significantly, as cleanup activities have been completed at 91 sites in 30 states. For example, the Fernald site in Ohio and the Rocky Flats site in Colorado, both of which once housed large industrial complexes, are now wildlife refuges that are also available for recreational use. At the Hanford Site in Washington State, the bulk of the cleanup along the Columbia River corridor has been completed including: six reactors cocooned, 502 facilities demolished, 1,201 waste sites remediated, and 16 million tons of waste removed. At the Oak Ridge site in Tennessee, we have completed the decommissioning of five gaseous diffusion uranium enrichment processing facilities---the first time such an

accomplishment has been achieved in the world. At the Idaho National Laboratory, we have decommissioned and demolished more than two million square feet of excess facilities, and removed all EM special nuclear material (e.g., highly enriched uranium) from the state. At the Savannah River Site, we have vitrified about half of the tank waste, by producing more than 4,100 canisters of glass, we have also permanently closed 8 of 51 high level waste tanks, and successfully decontaminated and decommissioned approximately 290 facilities, including in-situ decommissioning of two former production reactors.

Today, EM is responsible for the remaining cleanup at 16 sites in 11 states. There is less than 300 square miles remaining to be cleaned up across the EM complex and progress continues. However, as many of us know, the remaining cleanup work presents some of our greatest challenges.

### **EM Cleanup Objectives and Priorities**

EM's first priority is worker safety and we continue to pursue cleanup objectives with that in mind. EM will continue to discharge its responsibilities by conducting cleanup within a "Safe Performance of Work" culture that integrates environmental, safety, and health requirements and controls into all work activities. Taking many variables into account, such as risk reduction and compliance agreements, EM has the following priorities:

- Radioactive tank waste stabilization, treatment, and disposal
- Spent nuclear fuel storage, receipt, and disposition
- Special nuclear material consolidation, stabilization, and disposition
- Transuranic and mixed/low-level waste disposition
- Soil and groundwater remediation
- Excess facilities deactivation and decommissioning

In particular, the FY 2018 budget request will allow EM to:

- Continue important cleanup activities at all of our sites in a safe and deliberate manner that ensures protection of our workers, the public and the environment
- Continue waste emplacement at the Waste Isolation Pilot Plant, including increasing the number of shipments
- Continue construction of the Low Activity Waste Facility, Analytical Laboratory, Effluent Management Facility, and supporting facilities at the Hanford site
- Complete commissioning and startup of the Salt Waste Processing Facility at the Savannah River Site
- Continue with commissioning and start-up activities for the Integrated Waste Treatment Unit at Idaho
- Complete design and begin construction of the Mercury Treatment Facility at Oak Ridge

Before discussing recent and near-term accomplishments, I want to provide a brief update on the recent incident at the Hanford Site that pertains to a partial collapse of one tunnel near the Plutonium Uranium Extraction Plant, also known as the PUREX facility. The tunnel, which has not been in operation for decades, has been used since the 1950s to store contaminated equipment from the PUREX operations. On May 9, as a part of our surveillance program, workers discovered that a 20 by 20-foot section of the tunnels had collapsed. Based on extensive radiological monitoring, including monitoring performed by the State of Washington's Department of Health, there has been no release of radiological contamination from the incident, and no workers were injured or exposed to radiological material as a result.

Workers have since filled in the collapsed section with soil and have placed a cover over the length of the tunnel. We are working closely with the state of Washington on longer-term actions which are under development. We take this event seriously, we will look closely at lessons learned from this event that may apply to other EM facilities. We are continuing to minimize the potential of a radiological release and ensure that our workers and the public are protected. We are committed to working with the State of Washington for a more permanent solution that focuses on maintaining the structural integrity of the tunnel and that permanently addresses the waste.

### **Key Recent and Near-Term Accomplishments**

I would now like to take this opportunity to highlight a number of EM's most recent accomplishments. Recently, the Waste Isolation Pilot Plant (WIPP) received its first shipments of transuranic (TRU) waste since it re-opened in January 2017. The shipments from the Idaho National Laboratory, Savannah River Site, and Waste Control Specialists in Texas were an important milestone for WIPP and for sites that stored TRU waste since WIPP ceased operations in February 2014. Shipments from Oak Ridge and Los Alamos National Laboratory are expected later this year. WIPP is currently receiving three shipments a week, and is expected to ramp up to four shipments a week by the end of 2017. This year, WIPP anticipates receipt of approximately 130 shipments of waste for emplacement in the underground.

EM is continuing to make steady and substantial cleanup progress across the complex. At the Savannah River Site, construction of the Salt Waste Processing Facility is complete. Once in operation, it will significantly accelerate EM's ability to treat tank waste at SRS. At Hanford, demolition of the Plutonium Finishing Plant, once one of the most dangerous buildings in the DOE complex, is now underway and is scheduled for completion later this year. This winter, workers at Idaho's Advanced Mixed Waste Treatment Facility completed a 15-year effort to

retrieve, characterize, treat and package more than 65,000 cubic meters of TRU waste (plutonium-contaminated waste boxes, drums, and dirt) to ready it for shipment to WIPP.

### **Highlights of the FY 2018 Budget Request**

The FY 2018 budget request for EM is the largest request in ten years and includes \$5,537,186,000 for defense environmental cleanup activities, of which \$225,000,000 would be used to address excess facilities to support modernization of the nuclear security enterprise. The Department's Excess Contaminated Facilities Working Group analyzed and developed options for how DOE may prioritize and address the numerous contaminated excess facilities owned by the various DOE program offices. The FY2018 budget request implements a targeted effort to accelerate deactivation and decommissioning (D&D) of specific high-risk facilities at the Y-12 National Security Complex and the Lawrence Livermore National Laboratory not currently in the Environmental Management programs' inventory to achieve substantial risk reduction within four years.

The request will allow EM to maintain a safe and secure posture across the complex, while continuing compliance activities. In FY 2018, we expect to continue to make significant progress in addressing radioactive tank waste at EM sites, as well as to continue our D&D activities and our soil and groundwater remediation activities. In addition, we will continue to manage and disposition special nuclear materials, spent nuclear fuel and transuranic and solid waste.

At WIPP, the FY 2018 request supports continued waste emplacement and ramps up receipt of TRU waste shipments. It also supports the completion of design work and begins construction of the new ventilation system and exhaust shaft.

At the Savannah River Site, the FY 2018 request supports the commissioning and startup of the Salt Waste Processing Facility, and the operation of the Defense Waste Processing Facility to produce 60 to 70 canisters of vitrified high-level waste. In addition, the request initiates the design of the Emergency Operations Center replacement project and supports the safe and secure operation of the H Canyon/ HB-Line for the purpose of processing aluminum-clad spent nuclear fuel and down-blending EM-owned plutonium. These processing activities will, ensure the availability of space in K- and L-Areas for the future receipt of excess research nuclear material that has been removed from civilian sites in foreign countries. These removals provide for safe, secure storage of this material.

At Hanford, EM is working aggressively to complete and commission treatment facilities to safely immobilize tank waste for disposition. The Office of River Protection's FY 2018 budget request represents planned efforts for continued progress required by the Tri-Party Agreement and 2016 Amended Consent Order. The request is designed to maintain safe operations for the

tank farms; achieve progress in meeting regulatory commitments; support the development and maintenance of infrastructure necessary to enable waste treatment operations; continue construction at the Waste Treatment and Immobilization Plant's (WTP) Low-Activity Waste Facility, Effluent Management Facility, Balance of Facilities, and Analytical Laboratory to support treatment of tank waste by 2023; and resolve significant technical issues with the WTP Pretreatment facility.

Ongoing Hanford cleanup efforts will continue at the Richland Operations Office. The FY 2018 budget request supports waste site remediation activities along the River Corridor and operations necessary to provide monitoring of the 324 Building; continues groundwater remediation and continues progress on the K West Basin sludge removal project.

At the Idaho National Laboratory, the FY 2018 request supports buried waste retrieval activities and work necessary to commission and startup the Integrated Waste Treatment Unit. Once this facility is in operation, it will treat the approximately 900,000 gallons of radioactive sodium bearing waste. The request also supports repackaging and the characterization of contact-handled transuranic waste at the Advanced Mixed Waste Treatment Project.

At Oak Ridge, the request supports continued demolition of the remaining facilities and site restoration at the East Tennessee Technology Park, as well as completion of the design and initiation of early site preparations for the Mercury Treatment Facility at the Y-12 National Security Complex. Additionally, the budget supports preparation of Building 2026 at the Oak Ridge National Laboratory to support processing of uranium-233 materials.

With some of the most challenging cleanup work still remaining in the EM program, we understand the importance of technology development in reducing lifecycle costs and enhancing our effectiveness. To help address many of the technical challenges involved with high-risk cleanup activities, the FY 2018 request of \$25,000,000 for Innovation and Technology Development projects to tackle our greatest challenges with remediation of Technetium-99, Mercury, Cesium-137 and Strontium-90, and the integration of advanced tooling and robotics for enhanced worker safety and productivity.

## Budget Authority and Planned Accomplishments by Site

### Office of River Protection, Washington (Dollars in Thousands)

FY 2017 Enacted	FY 2018 Request
\$1,499,965	\$1,504,311

#### Key Accomplishments Planned for FY 2018

- Continues construction and commissioning activities for the Direct Feed Low Activity Waste approach at the Waste Treatment and Immobilization Plant, and Low Activity Waste Pretreatment System
- Maintains tank farms in a safe and compliant manner
- Conducts Single-Shell/Double-Shell Tank Integrity assessments
- Supports single-shell tank retrieval activities and continues work to address tank vapor safety concerns.

### Savannah River Site, South Carolina (Dollars in Thousands)

FY 2017 Enacted	FY 2018 Request
\$1,369,429	\$1,447,591

#### Key Accomplishments Planned for FY 2018

- Completes Salt Waste Processing Facility commissioning and startup in late 2018
- Brings the Defense Waste Processing Facility back online to continue vitrifying high-level waste
- Initiates Saltstone Disposal Unit #7 design and initiate long-lead procurement for cell construction
- Down-blends EM-owned (non-MOXable) surplus non-pit plutonium for disposal at Waste Isolation Pilot Plant
- Processes aluminum clad spent nuclear fuel

**Carlsbad Field Office, New Mexico (Dollars in Thousands)**

<b>FY 2017 Enacted</b>	<b>FY 2018 Request</b>
\$324,720	\$323,041

Key Accomplishments Planned for FY 2018

- Continues waste emplacement and ramps up receipt of TRU waste shipments
- Completes design and begins construction on the new ventilation system and exhaust shaft

**Los Alamos National Laboratory, New Mexico (Dollars in Thousands)**

<b>FY 2017 Enacted</b>	<b>FY 2018 Request</b>
\$194,000	\$191,629

Key Accomplishments Planned for FY 2018

- Continues chromium plume investigation
- Completes town site cleanup of solid waste management units from the 1940s and 1950s production sites

**Idaho National Laboratory, Idaho (Dollars in Thousands)**

<b>FY 2017 Enacted</b>	<b>FY 2018 Request</b>
\$382,088	\$350,226 <sup>1</sup>

Key Accomplishments Planned for FY 2018

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<sup>1</sup> The amount reflects Defense Environmental Cleanup portion, the total Idaho National Laboratory FY18 Request is \$359,226,000.

- Continues with the deliberate commissioning and start-up of the Integrated Waste Treatment Unit to treat liquid radioactive sodium bearing waste
- Continues buried waste retrieval activities
- Supports repackaging and the characterization of contact-handled transuranic waste at the Advanced Mixed Waste Treatment Project
- Treats and disposes mixed low-level and low-level waste offsite
- Maintains all dry spent nuclear fuel storage facilities

**Oak Ridge Site, Tennessee (Dollars in Thousands)**

<b>FY 2017 Enacted</b>	<b>FY 2018 Request</b>
\$278,719	\$225,205 <sup>2</sup>

Key Accomplishments Planned for FY 2018

- Completes design and begins construction of the Mercury Treatment Facility
- Continues capital asset project to support processing U-233 materials
- Supports transuranic waste characterization and shipments to WIPP

**Richland Operations Office, Washington (Dollars in Thousands)**

<b>FY 2017 Enacted</b>	<b>FY 2018 Request</b>
\$913,936	\$798,192 <sup>3</sup>

Key Accomplishments Planned for FY 2018

- Continues K Basin sludge removal and supports operations and maintenance of K West Basin
- Supports safe storage of nearly 2,000 cesium and strontium capsules in the Waste Encapsulation and Storage Facility, and continues project planning for dry storage options for the capsules
- Continues integration of site-wide groundwater and vadose zone cleanup activities, groundwater monitoring, operations, maintenance, and necessary modifications of existing remediation systems
- Continues soil and waste site remediation along River Corridor

<sup>2</sup> The amount reflects Defense Environmental Cleanup portion, the total Oak Ridge FY18 Request is \$390,205,000.

<sup>3</sup> The amount reflects Defense Environmental Cleanup portion, the total Richland FY18 Request is \$800,422,000.

**Nevada National Security Site, Nevada (Dollars in Thousands)**

<b>FY 2017 Enacted</b>	<b>FY 2018 Request</b>
\$62,176	\$60,136

Key Accomplishments Planned for FY 2018

- Completes characterization activities for six contaminated soil sites
- Completes closure activities for one soil corrective action site
- Supports cleanup activities across the DOE complex by providing disposal capacity and services for up to 1.2 million cubic feet of low-level and mixed low-level radioactive waste

**Conclusion**

Madam Chairwoman Fischer, Ranking Member Donnelly, and Members of the Subcommittee, I am honored to be here today representing the over 20,000 men and women that carry out the Office of Environmental Management mission. Our request will enable us to continue to make progress with our mission and to realize a significant set of accomplishments across the EM program. We are committed to achieving our mission and will continue to apply innovative environmental cleanup strategies to complete work safely and efficiently, thereby demonstrating value to the American taxpayers. All of this work will, first and foremost, be done safely, within a framework of best business practices. I am pleased to answer any questions you may have.

Statement of Admiral James F. Caldwell  
Deputy Administrator for Naval Reactors  
National Nuclear Security Administration  
U.S. Department of Energy  
on the  
Fiscal Year 2018 President's Budget Request  
Before the  
Senate Committee on Armed Forces  
Subcommittee on Strategic Forces

May 24, 2017

Since USS NAUTILUS (SSN 571) first signaled "*Underway on nuclear power*" in 1955, our nuclear powered ships have made extraordinary contributions to our national defense. From the start of the Cold War to today's multi-threat environment, our nuclear navy ensures continued dominance of American seapower. Over 45 percent of the Navy's major combatants are nuclear powered (10 aircraft carriers, 14 ballistic missile submarines, 57 attack submarines, and 4 guided missile submarines) capitalizing on the mobility, flexibility, and endurance of nuclear power that enables the Navy to meet its global mission.

Over the past year, the Navy, with Naval Reactors support, deployed 33 submarines and conducted 32 strategic deterrent patrols. In addition, at any given time, there were always at least 56 of 75 submarines deployed or ready to deploy within a few days. Our carriers, USS JOHN C. STENNIS (CVN 74), USS HARRY S. TRUMAN (CVN 75), and USS DWIGHT D. EISENHOWER (CVN 79), completed successful deployments, and the USS RONALD REAGAN (CVN 76) stood ready as the forward-deployed carrier in Japan. We also saw the christening of the attack submarines PCU COLORADO (SSN 788) and PCU INDIANA (SSN 789), our fifteenth and sixteenth VIRGINIA class submarines. We have also added another attack submarine to our force by commissioning USS ILLINOIS (SSN 786), and we've completed initial sea trials for the Navy's newest submarine USS WASHINGTON (SSN 787). And last, as a testament to the ability of our design and technical base, USS HELENA (SSN 725) made submarine history by being the first submarine to travel 1 million nautical miles on a single reactor core.

Recently, I participated in sea-trials on the first FORD Class Aircraft Carrier, the GERALD R. FORD (CVN 78). This ship has the first new design aircraft carrier propulsion plant in 40 years, and I'm happy to report that in terms of propulsion capability, FORD met the high speed of our NIMITZ-Class ships and delivered major increases in electrical power and core energy with half the manning in the reactor department. While we have worked through several challenges testing and operating the first-of-class propulsion and electrical generation and distribution system on the ship, the fact that these problems were safely and efficiently resolved is a testament to the technical skills and hard work of the nuclear shipbuilding design and industrial base, as well as the skilled Sailors operating this equipment. This historic milestone represents the culmination of almost 20 years of dedicated and sustained effort by Naval Reactors and its

field activities, our Department of Energy laboratories, nuclear industrial base suppliers, the Navy design team, and the nuclear shipbuilders.

In addition to supporting these nuclear powered combatants, Naval Reactors has safely maintained and operated two nuclear powered land-based prototypes – both over 39 years old – to conduct research, development, and training, as well as two Moored Training Ships – both over 53 years old – the oldest operating pressurized water reactors in the world. These operational reactors provide highly qualified operators to the nuclear fleet, and today our nuclear fleet is fully manned.

The strong support of this subcommittee last year enabled safe operation of the fleet, Naval Reactors mandatory oversight, and continued progress on key projects. Naval Reactors' budget request for Fiscal Year (FY) 2018 is \$1.48 billion, an increase of 60 million dollars, or 4 percent, over the FY 2017 enacted funding level. In addition to supporting today's operational fleet, the requested funding will enable Naval Reactors to deliver tomorrow's fleet by continuing funding for three national priority projects and recruiting and retaining a unique, highly skilled work force committed to the Navy and the nation. The projects are:

- Continuing to design the new propulsion plant for the COLUMBIA-class ballistic missile submarine, which will feature a life-of-ship core and electric drive;
- Refueling a research and training reactor in New York, to facilitate COLUMBIA-class reactor development efforts and provide 20 more years of live reactor based training for the fleet operators; and
- Building a new Spent Fuel Handling Facility in Idaho that will facilitate long term, reliable processing and packaging of spent nuclear fuel from aircraft carriers and submarines.

We are at our peak in design efforts supporting the new propulsion plant for the COLUMBIA-class SSBN - the Navy's number one acquisition priority. Providing unparalleled stealth, endurance, and mobility, our ballistic missile submarine force has delivered more than 60 years of continuous at-sea deterrence, and it continues to be the most survivable leg of the nuclear triad. COLUMBIA-class SSBN activity this year includes reactor plant design and component development to support procurement of long lead reactor plant components in FY 2019. The funding requested ensures we maintain progress with this plan and alignment with the Navy as the program moves toward construction start in FY 2021.

Supporting both the COLUMBIA-class effort and the Program's training needs, the FY 2018 budget request supports the land-based prototype refueling overhaul at the Kesselring Site in upstate New York. In FY 2018, Naval Reactors continues the core manufacturing work needed for the refueling overhaul, which retires manufacturing risk for the life-of-ship core for COLUMBIA-class. Further, plant service-life engineering design will be largely completed in FY 2018 to ensure that the land-based prototype overhaul, performed concurrently with refueling, supports 20 additional years of Naval Reactors' commitment to research, development, and training in upstate New York.

The Naval Reactors FY 2018 Budget Request also contains funds to continue the Spent Fuel Handling Recapitalization Project. Congressional support in FY 2016 and FY 2017 for this much needed project has enabled progress on site preparations, long lead material procurements starting this fiscal year, and approval of the National Environmental Policy Act Environmental Impact Statement Record of Decision. In addition to starting site preparation and long lead material procurements, we are using the \$100 million received in FY 2017 to finalize key facility and equipment requirements and advance facility design to support establishing the Performance Baseline and authorizing the start of construction in FY 2018. Continued Congressional support will ensure that the facility in Idaho is ready to receive spent nuclear fuel from aircraft carriers in FY 2024 and be fully operational by 2025.

In addition to our three main priority projects, Naval Reactors also maintains a high-performing technical base to execute nuclear reactor technology research and development that guarantees our Navy remains technologically ahead of adversaries, as well as the necessary equipment, construction, maintenance, and modernization of critical infrastructure and facilities. By employing an efficient and effective technical base, the teams of talented and dedicated people at our four Program sites – the Bettis Atomic Power Laboratory in Pittsburgh, the Knolls Atomic Power Laboratory and Kesselring Site in greater Albany, and the Naval Reactors Facility in Idaho – can perform the research and development, analysis, engineering, and testing needed to support today’s fleet at sea and develop more capable nuclear-powered warships. Our labs perform the technical evaluations that enable Naval Reactors to thoroughly assess approximately 4,000 emergent issues annually and deliver timely responses that ensure nuclear safety and maximize operational flexibility. This technical base supports more than 17,500 nuclear-trained Navy sailors, who safely maintain and operate the 101 nuclear propulsion plants in the fleet 24 hours per day, 365 days per year around the globe.

At the requested funding level, Naval Reactors can safely maintain and oversee the nuclear-powered fleet. Naval Reactors is committed to executing our projects on time and on budget, and continuing the drive for the safest and most cost effective way to support the nuclear fleet. I respectfully urge your support for aligning funding allocations with the FY 2018 Budget Request.

# Embedded Secure Document

The file [https://www.armed-services.senate.gov/imo/media/doc/Trimble\\_05-24-17.pdf](https://www.armed-services.senate.gov/imo/media/doc/Trimble_05-24-17.pdf) is a secure document that has been embedded in this document. Double click the pushpin to view.

