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U.S. Department of Energy
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Mr. Chairman and distinguished members of the Committee, thank you for the opportunity to testify on the Department of Energy's FY 2000 Defense Program budget request of approximately $4.5 billion. This budget continues support for Stockpile Stewardship Program initiatives begun during the past five years that are creating and using the new tools and technologies needed for science based stewardship. These tools and technologies are necessary to maintain high confidence in the safety and reliability of the U.S. nuclear weapons stockpile without nuclear testing and in the absence of new weapons development.

It has been nearly 10 years since we have manufactured a new nuclear weapon and over six years since the last underground nuclear test. Our confidence in the safety and reliability of the current stockpile remains high. The third annual certification of the nuclear weapons stockpile was transmitted to the President by the Secretaries of Energy and Defense on December 22, 1998. It states that the stockpile is safe and reliable and that there is no need to conduct an underground nuclear test at this time.

The Stockpile Stewardship Program still faces formidable challenges: continue to maintain an aging stockpile; restructure and modernize the weapons complex; and, retain the capability to resume nuclear testing and reconstitute production capabilities, should national security require either in the future. The Department is meeting these challenges and is confident of its abilities both to maintain the stockpile indefinitely without testing, and to keep all risks at a manageable level.

We have laid out a plan --- weapon by weapon, part by part, that addresses the tasks required to maintain the stockpile over the next ten years, and beyond. We have concurrence on this program from the Department of Defense, and the Administration has committed to funding this program and all its parts. And, we have a back up. The President, as one of the safeguards under which this nation would enter into the Comprehensive Test Ban Treaty (CTBT) requires us to maintain the Nevada Test Site in a state of readiness should there ever be circumstances in which we would return to testing. The successful subcritical and other experiments conducted there bear evidence that the Nevada Test Site remains a Acan do@ operation. There is a joint DoD/DOE review of the entire test readiness program for the 2001 budget process.

Another Presidential safeguard under the CTBT requires us to maintain the vitality of the nuclear weapons laboratories -- Los Alamos, Lawrence Livermore and Sandia. History tells us that great laboratories need great missions like the Manhattan and Apollo projects. The enthusiasm and vigor with which our laboratories are embracing the Stockpile Stewardship Program bear witness that it too is a great mission. The program is attracting the kinds of people drawn to the challenge of solving tough issues of national importance.

Although we continue to plan and refine the Stockpile Stewardship Program, it is already working. We have modified the B61 bomb and have seen it enter the stockpile to replace the aged B53 bomb. We are constructing new experimental facilities and tools -- the National Ignition Facility (NIF), the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT), and Atlas -- and our computation program has developed the world=s fastest supercomputers. By using stewardship tools, we have solved some problems that in the past would have most likely required nuclear testing. We have done literally hundreds of experiments on existing facilities that increase our understanding of nuclear weapons. We have safely dismantled over eleven thousand nuclear weapons since 1991, and have produced numerous parts, on time, while continuing to downsize the complex.

Stockpile Stewardship Interagency Coordination

A key element of the Stockpile Stewardship Program's continued success is an effective corporate level strategic planning process. I am pleased to advise you that we are on schedule to transmit the Fiscal Year 2000 Stockpile Stewardship Plan (SSP), also called "The Green Book" to the Congress by mid-March. In the development of the SSP, we rely heavily on the Department of Defense, the National Security Council staff, the Office of Science and Technology Policy, the OMB, and other senior policy officials in the Anuclear community@ to help ensure that we are on the right track. The feedback we have received on this year=s Plan is very favorable. In fact, I was recently informed in a letter from the Commander in Chief of the U.S. Strategic Command, Admiral Richard Mies, that this Plan reflects a strong commitment by DOE to solicit and address the concerns of the nuclear weapons community.

During 1998, the Nuclear Weapons Council (NWC) reviewed four major areas of the Stockpile Stewardship Program: tritium, the Accelerated Strategic Computing Initiative (ASCI), the National Ignition Facility (NIF), and pit production. The Nuclear Weapons Council concluded that joint DOE/DoD team efforts were worthwhile, generating alternative options and validating DoD requirements and DOE plans. The NWC found that tritium, NIF and ASCI programs were on-track. The NIF program integration was identified as a potential concern by the NWC which we are addressing now. The NWC further examined the management and oversight cost controls of ASCI software development in more detail and found that the proper project cost and schedule controls are in place. After reviewing the DOE pit production plan and alternatives for larger and smaller production capacities developed by the joint DOE/DoD team, the NWC decided that the current DOE plan is a prudent approach. The NWC approved DOE's pit manufacturing strategy and will monitor the development of long-term plans. This strategy for pit manufacturing will be detailed in our response to the FY 1999 National Defense Authorization Act and submitted to Congress shortly.

To better retain U.S. nuclear capabilities, we have been working closely with the Commission on Maintaining U.S. Nuclear Weapons Expertise, better known as the Chiles Commission. As you know, Congress tasked the Commission with developing a plan for recruiting and retaining scientific, engineering, and technical personnel that the Commission deems are needed, across the nuclear weapons complex over the long term, to maintain a safe and reliable nuclear weapons stockpile without nuclear testing. The Chiles Commission report is due to Congress March 15, 1999.

<u>How Stockpile Stewardship Is Working</u>

For the benefit of new Committee members, I will briefly summarize the Stockpile Stewardship process and the challenges it now faces before I go into a more detailed discussion of program elements. Each year representative samples of each type of weapon are returned from the active forces and are disassembled, examined, tested, and analyzed for defects, much as you would go for an annual physical or take your car into your local automobile mechanic. If any defects are found, their effect on reliability and safety is assessed. If that effect is deemed significant, the defective part is remanufactured and replacedBand a nuclear weapon has about as many parts as a modern automobile. Like the battery or spark plugs in your car, some parts, for example, neutron generators and gas reservoirs, require replacement at regular intervals. Other parts of a nuclear weapon are made from radioactive materials which decay such as plutonium, enriched uranium and tritium; and as they decay, may change both their own properties and the properties of other materials within the weapon.

extraordinary accidents with less than a one-in-a-million chance of exploding. New industrial materials and new manufacturing processes make it hard to get exact replacement parts for an old car or appliance. Yet, we must produce replacements with modern material and processes will still maintain weapons safety and reliability.

As our stockpile weapons age we expect more parts to become defective -- just as with our automobiles. Because new warheads have not been produced since 1989, we cannot replace old weapons with new ones. In addition, our weapons designers with nuclear testing experience are also aging. In about ten years, most of them will have retired. This means that as our newest system, the W88, reaches the end of its original design life in 2014, and we may no longer have anyone with the necessary job experience to perform underground testing of nuclear weapons. Similarly, the engineers and technicians who originally produced even this newest weapon may

Program.

divide the explosion sequence into each of its parts, then test and analyze each of these separately, plan to put all the data together into a computer calculation -- a simulation -- to see if the results of each of the separate tests, and where they exist, the results must be consistent with data

Stockpile Life Extension and Surveillance

of each weapon system in the stockpile. The Stockpile Life Extension Program (SLEP) is DOE's options are developed to address potential refurbishment actions. These life extension options B "coulds" to improve safety and use control. These life extension options allow the Department equipment, and facilities.

research and development activities at our laboratories and for guiding our production plants in development and certification of new manufacturing processes. The cycle is continuous and is of experiments and simulations being performed to help identify which parts of a weapon are

Stockpile surveillance has been a major element of the U.S. nuclear weapons program ever since examined each year. The results provide data not only for assessing the current safety and required to anticipate weapons refurbishment requirements.

a fundamental understanding of materials properties and weapons science, to significantly improve explosive, ultimately concluding that the changes actually improved the stability of the explosive. program, thus avoiding significant costs. We have also embarked on a novel strategy to and when facility investments must be made in order to support pit replacement.

Dual revalidation is designed to provide a baseline assessment of the condition of weapons in our

weapon and the second from the other weapons laboratory, are performing in-depth evaluations of the weapon's ability to meet revalidated military requirements. The W76 is the first weapon to

collaborated on a Shipboard Vibration Test. The review of the W76 will be competed in December 1999. The dual revalidation peer review program not only baselines the weapon

to the next generation of scientists and engineers.

Manufacturing Capabilities

Manufacturing continues to play a critical role in the Stockpile Stewardship Program. During FY 1998, almost 1,000 Limited Life Components (LLCs) were produced. Plans call for the production of over 1,300 LLCs in FY 1999. These product deliveries signal the successful transfer of production activities from plants which have been closed. The weapons complex is also performing major refurbishment actions on several weapon types, including the B83, B61, and the W87. In December 1998, the Y-12 plant at Oak Ridge completed and shipped to Pantex the first refurbished canned sub-assembly for the life extension program of the W87 under our Stockpile Life Extension Program. Earlier this month, the first deliveries of electronic and mechanical parts for the W87 life extension were shipped to Pantex from the Kansas City plant. The first W87 life extension unit will be assembled at Pantex by the end of this month with the first group of units due for delivery to the Air Force in May. This is considered a major milestone in meeting a DOE commitment made to the Air Force.

The Advanced Manufacturing Design and Production Technologies Initiative (ADAPT) is providing the manufacturing complex with advanced capabilities for: designing, developing, and certifying components and systems; and for producing, assembling, and delivering the components and systems products. ADAPT is radically changing how DOE supports the nuclear weapons stockpile by infusing new product and process technologies, and by adopting state-of-the-art business and engineering practices. Our production complex must take advantage of modern manufacturing techniques. As an example, a secure communications and data network was established among the production plants and laboratories which is facilitating rapid interchange of design and manufacturing information related to the W87 life extension program. In the future, this will serve as the backbone of a modern simulation product realization environment. The network is already reducing the time needed to produce classified parts, in some instances up to 90 percent.

We remain committed to maintaining a robust and world-class microelectronics capability at Sandia National Laboratories. This effort will allow us to both develop and exploit emerging technologies that show great promise for miniaturizing weapon components and improving their reliability and for maintaining a critical capability in radiation-hardened electronics needed to address the threat environments of the future.

Toward that end, in December 1998, the Department of Energy and Intel Corp. announced that Intel Corp. will provide a no-fee license for its Pentium**7** processor design to Sandia National Laboratories for the development of custom-made radiation-hardened microprocessors for use in United States satellite, space vehicles, and defense systems. The agreement will save U.S. taxpayers hundreds of millions of dollars in microprocessor design costs and provide the federal government with a ten-fold increase in processing power over the highest performing existing technology. Radiation hardening "immunizes" systems and applications from ionizing radiation, such as cosmic rays, which affect the reliability of conventional electronics. Prototypes of the custom chips will be fabricated and tested at Sandia's Microelectronics Development Laboratory. While our production workload is certainly far smaller than in the past, the demands on our manufacturing processes have actually increased. Let me explain what I mean. We now know how critical baseline data is to stockpile certification in the absence of underground testing. Understanding how parts change over time involves comparing old and new parts. In the past, our production facilities built components with a primary focus on staying within design and process specifications. However, we have learned that seemingly insignificant variations in products or processes at the time of manufacture can often be the key to component lifetime.

Thus, we have significantly expanded the amount and type of baseline data, critical to modeling, collected during production. We now record much more than just the product specifications. We collect information on the physical and chemical properties of individual parts as well as the constituent raw materials. New parts receive significant analysis using new technologies and characterization tools covering the full scale from the macroscopic to microscopic level. Processes are also being re-instrumented to capture key parameters during production. All information is collected in readily accessible databases. The future of certification relies, in part, on our ability to accurately record the condition of parts as they were built. These investments in baselining tools and technologies will continue across the complex with future life extension activities.

We are continuing to right-size and modernize our production complex for the 21st Century. The Stockpile Management Restructuring Initiative (SMRI) is the first step and includes the tritium facilities at the Savannah River Site; uranium machining, recycling and storage facilities at the Oak Ridge Y-12 Plant; assembly and high explosive fabrication facilities at the Pantex Plant; and non-nuclear production facilities for electronic, electro-optical devices, plastic and machined parts at the Kansas City Plant.

A pit production capability is being reestablished at the Los Alamos National Laboratory, a capability the DOE has not had since the closure of the Rocky Flats Plant in 1989. A W88 first development unit pit was successfully produced last year and by 2001, the first pit for stockpile use will be produced. By 2007, LANL will have a limited capability to manufacture replacement pits for the units destroyed during surveillance activities.

The final phase of a five year process to resume enriched uranium operations at the Oak Ridge Y-12 Plant will be completed in FY 1999. The Kansas City Plant has now been qualified for the production of tritium gas reservoirs for the W76, W78 and W80 warheads and Sandia National Laboratories will soon have a new production facility on-line for neutron generators and will deliver almost 300 units in FY 2000.

In November 1998, the Heartland computer, one of the largest and most powerful computer system operating in a North American manufacturing facility was installed at the Kansas City Plant. Over the first two weeks in January, over 140 jobs were executed on seven different product/technology transfer efforts. This compares to only 17 jobs processed the same time last year.

In addition, over 1,000 nuclear warheads were safely dismantled at the Pantex Plant in FY 1998, approximately 275 dismantlements will be completed in FY 1999, and 375 dismantlements are planned for FY 2000. The decrease in quantity after FY 1998 does not reflect a decrease in workload because the systems remaining to be dismantled involve more complicated procedures and therefore, required additional time and resources. Dismantlements resulting from the nation's response to START I, however, will essentially be completed by FY 2001.

In December 1998, Secretary Richardson announced that a review of the management structure throughout the DOE will be conducted before making a final decision on a proposal to consolidate contracts at our defense weapon production facilities. Under this concept, the management and operating contract for the Kansas City Plant in Kansas City, Missouri, the Y-12 Plant in Oak Ridge, Tennessee, and the Pantex Plant in Amarillo, Texas, would be consolidated into a single contract. The Department will centralize management and operating responsibility for those three sites into a consolidated contract only if a potential contractor can demonstrate significant benefits to DOE through improved programmatic performance and integration and cost efficiencies.

Tritium

Current policy requires the Department to develop a new tritium production source by FY 2005 to support a START I nuclear stockpile with a five-year reserve, and to maintain the ability to "hedge" to a START I level even if the START II Treaty enters into force. Tritium, which decays fairly rapidly, has not been produced in the U.S. since 1988 and defense requirements have been met by the recycling of tritium from dismantled weapons. Secretary Richardson announced on December 22, 1998, a decision to use existing light water reactors as the primary source of tritium s Watts Bar and Sequoyah reactors as the

the linear accelerator as the back up technology for tritium production. The Department will complete engineering development and preliminary design for the accelerator.

Tritium Supply and Recycling, the projects for both dual-track options were subjected to numerous reviews by independent groups of experts. Regulatory oversight was provided by the

appropriate areas. A review of nonproliferation aspects was provided by an interagency review group.

reactors was preferred because this alternative uses proven technology, offers the best deal for taxpayers, has the most flexibility to meet present and future tritium requirements, and is most

Economy Act on an as-needed, pay-as-you-go, cost basis is expected to result in operating costs being as low as possible for the production of tritium. The Secretary of Defense publicly

expeditiously review requests for regulatory approvals associated with the use of tritium-producing burnable absorber rods in NRC-licensed reactors. Irradiation services at TVA facilities

Extraction Facility (TEF) at the Savannah River Site. Construction of the TEF will begin in FY 2000 and is scheduled to begin operations in early FY 2006.

It is at the DOE's Los Alamos, Sandia, and Lawrence Livermore National Laboratories and at the Nevada Test Site that the science base of the Stockpile Stewardship Program is developed.

sequence into each of its parts, and analyze each separately. Information that we have from the production and surveillance activities described previously, helps us to focus our experimental

know and where we need to fill in gaps in our knowledge through experiment and observation.

Hundreds of experiments, large and small, are performed each year in support of Stockpile

publicity. The sixth subcritical experiment, nicknamed Clarinet, took place on February 9, 1999. This experiment was the second of three originally planned for FY 1999; however, our current

experiment. Two subcritical experiments are planned for FY 2000 and additional smaller experiments are being considered.

Subcritical experiments help us fill in gaps in empirical data on the high pressure behavior of plutonium; realistically benchmarking data on the dynamic, non-nuclear behavior of components in today's stockpile; analyzing the effects of remanufacturing techniques; understanding the effects of aging materials; and addressing other technical issues. Information from these experiments will be key to qualifying the pit production capability at Los Alamos National Laboratory (LANL), as well as certifying the performance of weapons which will contain the replacement pits. These experiments also contribute significantly to the maintenance of the critical infrastructure and educational base of skilled personnel at the Nevada Test Site. In addition to helping us understand the effects of aging on plutonium, these experiments are key to our test readiness program. Subcritical experiments are consistent with the safeguards under which the President has recommended ratification of the Comprehensive Test Ban Treaty (CTBT).

We do a good job of investigating the first part of the nuclear explosion; that is, the implosion of the plutonium pit by high explosive, with non-nuclear experiments. We can measure a number of important features by taking x-ray pictures during critical parts of the experiment. We can then compare these pictures with calculations and with previous data from the more than 1,000 underground nuclear tests and 14,000 surveillance tests. During FY 1998, we conducted some 50 non-nuclear hydrotests at the Pulsed High Energy Radiographic Machine Emitting X-rays (PHERMEX) and the Flash X-Ray (FXR) machine facilities at LANL and Lawrence Livermore National Laboratory (LLNL) respectively. We will do approximately the same number in FY 1999 and in FY 2000. In addition, we plan to conduct approximately 150 less complex experiments per year aimed at understanding and answering questions about high-explosives behavior and explosive effects on materials.

Experiments using the Los Alamos Neutron Science Center (LANSCE) are investigating proton radiography, a new technique in which proton beams from a linear accelerator are used directly in a novel approach to hydrodynamics-radiography that, if successful, could provide additional information to our process of certifying pits. This technique is one of the candidate technologies being considered to make detailed, three-dimensional "motion pictures" of the implosion process. Smaller-scale dynamic proton radiography experiments have already been performed at LANSCE to address important certification issues (e.g., cold high-explosives performance), paving the way for validation of advanced explosives simulation models.

This year we will be conducting a series of measurements at the Brookhaven National Laboratory as a next step in evaluating protons for weapon radiography. Such technology could be used in an advanced hydrotest facility should existing tools prove insufficient to meet the mission of Stockpile Stewardship. Accelerator experiments are also being used to probe basic properties of weapons materials that have a direct bearing on the functional lifetime, hydrodynamic behavior, nuclear performance, aging and corrosion of weapons materials and components. Based on these experiments, data can be extracted on equation of state, strength, microstructure, and aging properties of weapons materials.

In the area of inertial confinement fusion (ICF), the Department is continuing to carry out an aggressive research program to support the stockpile. In order to transfer resources to the National Ignition Facility project, the Nova laser at LLNL is scheduled for shutdown in 1999.

are planned for Omega in FY 2000. A major activity at Omega in FY 1999-2000 will be installation and operation of a cryogenic target handling system in preparation for deuterium-

In 1998, the Z-pulsed power facility at Sandia achieved a record x-ray energy and temperature levels. In 1999 and 2000, we plan to conduct about 160 shots in Z in the areas of weapons

the installation of the Beamlet laser from Lawrence Livermore National Laboratory which will be used as a diagnostic on Z. This diagnostic will enhance investigations in all areas. The ICF

other stewardship issues during NIF operations.

These, and other experimental facilities that are on line or under construction, are expected to

Whenever feasible, the goal is to obtain data experimentally by more than one method in order to improve our confidence in the associated physics models being used in the advanced Accelerated

Progress On Major Experimental Facilities

Construction is well underway for three major facilities that are essential to the long-term success

Radiographic Hydrodynamic Test Facility (DARHT), and Atlas. NIF, the world's largest laser, will enable our scientists to generate conditions of temperature and pressure approaching those

under these unique conditions will provide data essential to test the validity of computer based predictions. The NIF building is about 47 percent completed. The siding and roofing were

chamber. The first NIF experiments are planned to begin in October 2001 using eight of 192 laser beams. The NIF is expected to be completed on schedule in October 2003, and on budget at

We continue making good progress in completing the DARHT facility. This facility will examine the shape and size of an imploding pit model from two different directions with greatly improved

pictures at more than one point in the implosion process. Construction of the facility to house the x-ray machines was completed and the first arm of the facility, using a single pulse accelerator, prototyping of the second arm is well underway and this multi-pulse machine is scheduled for completion in FY 2002.

The Atlas pulsed power facility is under construction at LANL. The design of Atlas is complete, the large and long-lead procurements have been placed, and the assembly of the first segment of the machine is underway. The Atlas facility is scheduled to be completed and commence operations in 2000. Atlas will provide an improved capability to conduct hydrodynamic experiments for certification of secondary assemblies in nuclear weapons.

Data from U.S. nuclear test, from experiments and from surveillance and production activities, provide input to the Stockpile Stewardship Program supercomputers. Sandia, Los Alamos and Lawrence Livermore National Laboratories are collaborating on the supercomputing program. While advanced computing has always been a feature of the nuclear weapons program, the computing speed, power and level of detail required to certify existing nuclear weapons without nuclear testing by 2004 has required an extraordinary collaborative effort that is breaking barriers undreamed of only 5 years ago.

Simulation and Computation

The Accelerated Strategic Computing Initiative (ASCI) is developing the high-performance computational modeling and numerical simulation capabilities necessary to integrate theory, existing data, and new experimental data to predict results that can be verified and validated. The ASCI program, a collaborative effort between the Government and U.S. industry, is developing the world's fastest, most powerful computational and advanced simulation and modeling capabilities. These advanced supercomputers are needed to complete the shift from nuclear test-based methods to science-based methods and to assess and certify the safety, security, and reliability of the stockpile without underground nuclear testing.

Advanced computational capabilities that include application codes, computing platforms, and various tools and techniques, are being developed under ASCI and incorporated into ongoing stockpile computational activities. This technology is being developed at about twice the rate of commercial computing speed and power advances. ASCI has been highly successful in meeting its milestones and providing effective new tools to support stockpile stewardship. Information developed from other elements of the Stockpile Stewardship Program, such as NIF and our subcritical experiments, will provide the basic physics models and data for ASCI simulations.

At the end of FY 1998, ASCI unveiled its second generation of computing systems. Two major systems capable of running in excess of three trillion operations per second (3 teraops) peak speed were delivered ahead of schedule and within budget. Blue Pacific, developed by IBM, is located at LLNL, and Blue Mountain, developed by Silicon Graphics, Inc., is located at LANL. These systems are each 15,000 times faster and have roughly 80,000 times the memory of the average personal desktop computer. On February 12, 1998, the Department announced the selection of IBM to partner with ASCI on the Option White 10 teraops supercomputer to be located at

LLNL. Building upon the experience and knowledge gained with the 3 teraops Blue Mountain

performance level of 30 teraops by mid-year 2001. And the Department=
Red Intel computer system, installed at Sandia National Laboratories in 1996, with a peak speed of 1.8 trillion operations per second is now operating in production mode.

in the university community through the Academic Strategic Alliances Program. In 1997, the Department awarded contracts to five major U.S. universities--Stanford University, California

Illinois. The work of the university teams will be of similar difficulty and complexity to that needed for Stockpile Stewardship and provide another benchmark by which we can assess the

simulation technologies as well as to discoveries in basic and applied science; areas important to ASCI, the broader Stockpile Stewardship Program, and other application areas. Applications

defense scientific, economic and social priorities.

We are already utilizing the capabilities of the newly installed ASCI platforms to support

stockpile weapon, and we have run a 3-dimensional simulation that will help explain a A @
from the nuclear test archives, that is relevant to our current program. We have run simulations

simulations would not have been possible without the capability provided by the ASCI platforms performing at the teraops level. However, in order to simulate a 3-dimensional full-system

DOE national laboratories, we must scale the current capability to the 100 teraops level by 2004. The FY 2000 request is in line with planned increases resulting from advances in code

networking capability.

Under the $4.5 billion Stockpile Stewardship Program budget, the growth in the ASCI and
operating budget which totals $543 million is about 12 percent from FY

previously were part of the ASCI program plan and $36 million for construction projects to house ASCI computers. This continues the momentum in both hardware development and acquisition

building 3-D computer codes, which in conjunction
inertial confinement fusion, are aimed at providing the required levels of fidelity in weapons simulations. Two new computational initiatives begun in FY 1999 will continue in FY 2000. The
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communications technologies that will enable DP laboratories and plants to apply high-end of Stockpile Stewardship. The Numerical Environment for Weapons Simulations (NEWS) will create data exploration super corridors at the weapons laboratories to support large-scale data analysis for researchers and weapons assessment teams.

Nuclear Emergency Response and Technology Partnerships Programs

There are two other elements that exist across the weapons complex that play a role in maintaining the leading edge expertise of our people and program. Defense Programs funds DOE's nuclear emergency response programs which primarily consist of engineers, scientists, and other technical personnel from the three weapons laboratories, production facilities, and other DOE management and operating contractors. This program provides a technical response capability for any type of radiological or nuclear accident or incident including radiological releases, U.S. nuclear weapons accidents, or a malevolent event involving a nuclear device or radiological dispersal device. A robust exercise schedule provides challenging scenarios for all radiological emergency response assets in order to maintain and verify departmental readiness to meet our mandated responsibilities in conjunction with a wide range of interagency programs (e.g. Defense Threat Reduction Agency, Federal Emergency Management Agency, FBI, etc.). These scenarios include overseas nuclear weapons accidents, field training exercises, multi-agency resolution of nuclear terrorism crises, response to transportation accidents and commercial nuclear reactor accidents.

The DP Technology Partnership Program, which has been restructured to directly support Stockpile Stewardship, represents an important investment in the future. The private sector has technical leadership in many areas critical to weapons activities and the Technology Partnership Program initiates effective collaborations between the laboratories and industry that strengthen all Stockpile Stewardship Program components. It is a difficult task, but we already have success. For example, Sandia and a world class commercial electronics supplier of radio frequency (RF) products are partnering to develop a replacement arming, fusing and firing system for the W76/Mk4. This project will develop the capability for procuring war reserve RF components from a state-of-the-art, tailored, low-cost, low-volume, high-reliability manufacturing process. In addition, LANL is working with a provider of highly advanced, ultra-short pulse laser technology to develop sophisticated devices that will give LANL an entirely new capability to non-destructively inspect and measure the interior of a pit with extremely high resolution.

Program Integration

You have heard about how, over the last several years the Stewardship program has successfully set in motion a series of initiatives to ensure high confidence in the safety and reliability of the nuclear weapons stockpile without nuclear testing or traditional weapon phase development activity. Core technical capabilities have been fostered and facility milestones have been established to strengthen a strong science-based foundation for Stewardship. Construction of facilities like DARHT, NIF, and Atlas is now underway to provide state-of-the-art experimental facilities for pursuing fundamental weapons physics understanding. The subcritical experiments at NTS return extremely valuable data on the dynamic materials behavior of explosively driven plutonium. The ASCI program has successfully delivered world-class computational power and has focused and paced the development of simulation-based predictive capability that is required to integrate the scientific knowledge derived through ongoing experimental and theoretical program efforts. A Stockpile Life Extension (SLEP) program has formalized a disciplined process for introducing needed changes to the enduring nuclear weapons stockpile to address age-related risk. The time has now come to direct attention on a focused approach toward integrating the various Atools@ of the Stewardship Atoolkit@ to more effectively achieve strategic program objectives; namely, by methodically applying science in a timely way to confidently manage life extension in the nuclear weapon stockpile.

In the fall of 1998, I chartered a Program Integration Task Force composed of senior managers of the nuclear weapons laboratories and production plants, as well as the appropriate headquarters personnel with stewardship management responsibilities. The Task Force provided recommendations for: (a) taking the next steps toward more effective integration of science with stockpile deliverables; (b) providing more overall coherence among all program elements; and (c) identifying a basis for system-wide planning of program and budget.

The Task Force reported back to me in late November 1998. One of its main recommendations was to eliminate the organizational interface between the core stewardship R&D program, and the ASCI and stockpile computing program. This imperative was driven by the urgent need to accelerate integration of experimental data with the major three-dimensional weapons computer applications codes under development. In validating these codes, an improved predictive capability, derived from enhanced physics understanding of weapon performance and safety issues, could be more confidently applied in meeting critical certification milestones associated with stockpile life-extension modifications. As a result of this consolidation, the weapons science activities of the new organization could be more coherently managed at the interface with stockpile manufacturing and production activities.

The Task Force also emphasized the imperative for Headquarters to vigilantly manage the program balance at the science/production interface. Its suggestion was to apply a risk management approach in making programmatic tradeoffs between resources and deliverable schedules. The principle is fairly simple: weapons science activities not well integrated with stockpile deliverables would, in time, lose focus and drift away from relevancy and strategic objectives linked to the continued certification of weapon performance, safety, and reliability. On the other hand, any weapons production without the active integration of science through rigorous certification would eventually result in the inevitable loss of confidence without nuclear testing, thus losing nuclear deterrence for the Nation. Balancing these two major efforts under the stewardship Aumbrella@ will demand a more keen attention to enterprise-wide planning and budgeting, always governed by the principle that budget requirements should reflect an integrated set of program objectives.

In December of 1998, I took action on these Task Force recommendations by integrating the

and Simulation. This office is now actively pursuing program integration by working with the nuclear weapons laboratories and Nevada Test Site to jointly identify and begin planning a set of weapons technology campaigns@ Acampaign is defined as a major technical effort that focuses resources on developing a critical enabling technology to support confident certification.

predictive capability will drive each campaign. Thus, each campaign will be designed to integrate experiments, simulation, and weapon-system assessments. Campaigns will be focused on

NTS will join in a common, complementary effort to define appropriate technology milestones. Technical efforts will be designed to exploit the current experimental and computational

available. Collectively, the campaigns will be aimed at enhancing certification in the 2004 time frame, when about half of our nuclear-test-experienced weapon designers will have retired. By

of the next decade.

Campaigns will result in a clearer set of program expectations tied to needs and priorities. This in

precisely and far more measurably than has been done in the past. Ultimately, I believe, this will result in a better understanding of what the public is buying for the funds provided. I am

addressing what can not be provided at a given level of resources.

<u>Conclusion</u>

activities. Let me reemphasize that the current stockpile is well tested and well understood. The designers and engineers who built our existing weapons are still available and are still active.

who are working on the stockpile now, and are helping to train their successors. We are mindful, however, that the clock is ticking on both the design life spans of the weapons, and the career

unprecedented, but time sensitive, challenge to put in place both the tools and the people that will carry us beyond test-based expertise to science-based expertise for the future.

a safe and reliable stockpile without the need to conduct nuclear testing. I know of no other national security issue that is more important for our Nation today and for the next millennium.