

Testimony of Dr. Charles F. McMillan
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Good afternoon Chairman Udall, Ranking Member Sessions, and the members of the Subcommittee. My name is Charles McMillan and I am the Director of Los Alamos National Laboratory (LANL). I appreciate the opportunity to be here this today to discuss the challenges facing the nuclear weapons enterprise today.

Since I was last before you, Los Alamos has had to take steps, like the rest of the federal government, to deal with the consequences of declining budgets followed by sequestration. Although we have not yet had to furlough any of our permanent workforce this year, we are currently taking actions to constrain procurements and shrink the size of the subcontractor workforce. The sequester cuts resulted in roughly \$130 million in program reductions across the Laboratory. This cut is on top of the roughly \$450 million in reductions we have absorbed over the last two fiscal years. A little over a year ago, the Laboratory employed about 11,800 scientists, engineers, other professionals, and contractor partners. Today we are at 10,300.

As I stated before the Committee last year, NNSA governance will play a key role in determining both our efficiency and effectiveness as we address looming mission and budget challenges. The recently appointed members of the Congressional Panel on NNSA Governance bring many decades of experience and leadership in the weapons enterprise to this review. I am hopeful that the Panel will deliver recommendations that will foster a stronger relationship between NNSA, DoD, and the laboratories. I stand ready to work with the Panel should they ask for my participation. While governance will play a very important role in the future success of the enterprise, it is not the only piece in the puzzle. Future budgets and the balancing of the program will also play significant roles.

The President's 2014 budget request is encouraging. Although I am optimistic about the request, adequate funds are only the start. It is necessary that we maintain and develop the connection between the needs of the stockpile over the next decade and strategies to care for it – the people, programs, and infrastructure. I am encouraged by the consensus I believe is emerging around the Department of Defense' (DoD) 3+2 stockpile strategy, and the plutonium strategy we have been developing at Los Alamos. Nevertheless, we are going to be challenged to execute these strategies in the constrained fiscal environment our country faces today. We're going to need to find new ways to deliver the capabilities the nation needs.

Allow me make an analogy. You may have seen with the film "Moneyball," based on the book of the same name. When I lived in the Bay Area, the Oakland A's turned

baseball's conventional wisdom on its ear. They analyzed what really mattered to win. Conventional wisdom said it takes home runs and batting average to win – but the A's showed that on base percentage was a more important metric for winning.

They challenged conventional wisdom to increase value, and Mr. Chairman, I submit – now would be a good time for the nuclear weapons enterprise to do the same. I believe we need to challenge existing requirements to look for flexibility in how we are currently meeting our programmatic deliverables.

I am a realist. I doubt that our budgets will increase at the rate necessary to address both our aging stockpile and infrastructure with the approaches and constraints of the past. This indicates to me that current program models may need to be fundamentally altered to both maintain the deterrent going forward, and achieve a lower cost envelope that we can afford on an annual basis.

Los Alamos has reduced its staff size by roughly 1,500 employees, we have reduced benefits, and we have developed program plans with increased risk that still meet deliverables. Mr. Chairman, Los Alamos is approaching a tipping point. I am losing my mid-career staff at an accelerating pace because they are finding better opportunities elsewhere. Our nuclear infrastructure is not being modernized, the costs associated with our LEP activities continue to rise, and our weapons designers continue to be required to focus on our aging stockpile.

Infrastructure projects such as CMRR and MOX have been delayed, weapons experiments at important science facilities like DARHT and NIF are being scaled back, and our ability to recruit and retain staff is becoming increasingly difficult. It is a trend that does not bode well for us over the long-term.

The performance and execution requirements currently mandated by our customers, while important, are in many cases driving cost escalation. Conversely, there have also been changes in requirements, initiated by the Laboratory and accepted by the government, that are creating timely options. These options can meet stockpile needs and manage the cash flow for execution. I believe that the approach we have taken at Los Alamos in providing the capabilities of CMRR – an approach that challenges assumptions and existing requirements – may have promise for other parts of the program as we move forward in a constrained fiscal environment.

If, like the Oakland A's, we are to have a winning strategy with a lower budget, we will have to make fundamental changes in our basic assumptions.

As I look across the enterprise today, I see three areas of opportunity emerging as we manage the stockpile into the future:

- We should challenge the assumptions of “big-box” style nuclear facility construction.

- We must reexamine requirements driving our future Life Extension Programs – concentrating on value.
- And based on this examination, we should challenge our weapons experts to find workable solutions.

I believe we must look at these issues and decide very quickly how we are going to change the dynamic. As one of the individuals that assess the certification of the nation's stockpile, I will tell you emphatically that it is currently safe, secure, and effective, but it is not without risk. We must craft a program that will underwrite this statement for as long as our nation continues to require nuclear weapons to deter potential aggressors and assure our allies.

Nuclear Infrastructure Modernization

With the deferral of the CMRR-Nuclear Facility project and now the slowdown in the acquisition process for the MOX facility, plutonium capabilities appear to be on an unstable trajectory. In both cases, projected costs vastly exceed original estimates. There are many reasons why CMRR was deferred – from the incredibly long time it took to get from planning to design, to the many mission space requirement changes, and continually increasing safety and security requirements. Taken together, these have driven significant cost increases which are difficult to control and have now become common across the country in all of what I call the “big-box” nuclear facilities.

No one at Los Alamos was pleased with the decision on deferment; however, this decision created a unique opportunity for us to challenge the requirements that drove the existing design. CMRR was designed to be the classic “big box” nuclear facility – a “do it all under one roof” design. The intersection of the “3+2” strategy that has been developed by the DoD, the pits that will be required to support that strategy, and the deferred construction on CMRR has forced us to challenge the way we are doing business at Los Alamos today.

Working with our NNSA partners, we are recommending changes in requirements that are opening new options for facility acquisition. These changes should reduce cash flow profiles and extend the useful lifetime of our PF-4 plutonium pit production facility while supporting the nation's need for pits over the coming decades.

The first change occurred when the NNSA updated the 1992 assessment of the hazards associated with plutonium. This update allows us to increase the amount of plutonium in the newly completed Radiological Laboratory Utility Office Building (RLUOB) from 6 grams to 26 grams at the same administrative hazard level. This change in requirement will allow RLUOB to play a much bigger role in our plutonium strategy than previously planned.

In the second change, NNSA has agreed to reassess requirements that could allow us to repurpose existing PF-4 lab space.

Program requirements tend to follow national priorities that are somewhat cyclical between space exploration, nuclear power and national defense. These program and priority shifts typically occur with a period of a decade or more. Since the formative period of CMRR development in 2003, a decade has elapsed and there are opportunities to re-align portions of PF-4 that were in active use by other programs circa 2003.

For example, during the Cold War, plutonium was scarce and there was a premium on recovering it rather than discarding it. As a result, almost an entire wing of the four in PF-4 is devoted to recovering as much plutonium as possible from the waste stream.

Paradoxically, in another wing of PF-4 we are converting unneeded plutonium pits into oxide so that it can be burned in reactors to produce electricity. Both are using valuable nuclear facility space.

Finally, we are working with our federal partners to develop a new modular concept for smaller plutonium facilities that can be “networked” into our existing facilities PF-4 and the RLUOB. I believe that very large construction projects that need huge annual infusions of funding to stay on schedule have become too vulnerable to delays if a budget allocation is missed. The Achilles heel of these projects is cost escalation that inevitably happens when funding shortfalls collide with precise construction schedules.

Benefits of switching to the modular approach include:

- A shorter acquisition time
- Smaller annual cash flow profile
- Simpler construction of the second and subsequent modules through standardized design

We have typically tried to squeeze all of our mission requirements into one “big box” that builds tens of lab modules at the same time in a single complex facility project. We see the consequence: no capability until the whole facility is finished. In challenging this concept we believe that the path forward is to build one module at a time, standardize the design of the modules and acquire what we need, when we need it. We believe this approach, coupled with the changes to PF-4 and the RLUOB, can be used to meet mission needs as we move into the future.

Another concern we had when CMRR was deferred was that it pushed the potential construction period into an overlap with needed PF-4 life extension activities. I believe it would have been extremely costly to simultaneously build two facilities of

that magnitude. In our proposal, we examine the possibility of reducing the amount of the high hazard nuclear work in PF-4 by relocating it into the new modules. This reduces the risk profile in the older facility while providing lab space for less hazardous missions such as plutonium science. The process of transferring risk out of PF-4 should extend its useful lifetime and avoid a near-term, expensive replacement project. The result is a win-win situation.

I am proud of the way the Los Alamos team has demonstrated the creativity for which we are rightly known and has found ways to challenge assumptions and invent new options for the nation. In my view, a similar approach could be applied to future Life Extension Programs.

Life Extension Programs

The 2010 Nuclear Posture Review concluded that “The U.S. nuclear Triad of ICBMs, SLBMs, and nuclear-capable heavy bombers will be maintained under New START.” This position was based on a strategic risk assessment that

“After considering a wide range of possible options for the U.S. strategic nuclear posture, including some that involved eliminating a leg of the Triad, the NPR concluded that for planned reductions under New START, the United States should retain a smaller Triad of SLBMs, ICBMs, and heavy bombers. Retaining all three Triad legs will best maintain strategic stability at reasonable cost, while hedging against potential technical problems or vulnerabilities.”

As I examine the nuclear weapons enterprise and assess the needs of our nuclear deterrent in the future, maintaining the Triad on the current trajectory will lead to a collision between reasonable financial resources and mission requirements.

In the past 15 years, the nuclear weapons enterprise executed three life extension projects. Today, in order to maintain the Triad, the nation is faced with more complex and expensive life extension activities. The current B61 LEP is much more expensive than originally expected. The projected costs for the W78 intercontinental ballistic missile warhead, the W88 submarine launched ballistic missile warhead and the long-range standoff cruise missile warhead will likely follow the B61 LEP trend unless we change our approach.

Some have suggested that smaller total stockpile numbers will lead to substantial savings. On the contrary, the capabilities that the nation needs to have a nuclear deterrent are dominated by the *cost of the first weapon*, and as long as that weapon is in the stockpile, those capabilities must be sustained.

Stockpile weapons range in age from 22-35 years old. Materials and testing processes of that era allowed them to be churned off the production line. Today, many of those materials are no longer available commercially or are so exotic that the specialized

infrastructure that produced them has been abandoned. This has led to reclamation of some components from disassembled weapons or creation of components using new materials – processes that consume enormous amounts of time and money to ensure that these components will function as intended in the weapon.

As we execute the current W76 and B61 LEPs and look ahead to the W78 and W88 LEPs, the nation will be challenged to execute these programs in the current fiscal environment. We must implement a strategic risk assessment that balances value against costs to sustain the stockpile in a more effective manner.

The laboratories are already applying this methodology in their conceptual designs for reuse of pits with insensitive high explosives and the development of the alternative plutonium sustainment strategy using the modular design concept. Carefully selected subject matter experts were empowered to propose and evaluate radical ideas for attacking tough problems that resist conventional solutions. A similar non-traditional approach unconstrained by the “this is the way we have always done it” mentality is needed to attack the fiscal challenges of the current life extension program.

Weapons Designers: Looking Backward

Mr. Chairman, I must discuss the most important component at each of our laboratories: the people. Developing programmatic options, re-framing nuclear infrastructure requirements and proposing innovative solutions all depend on the creative experts directly engaged in our stockpile stewardship activities. Today we are fortunate to have experts with the breadth to work in all of these areas; however, I am concerned about their future.

I am sometimes asked, “When will nuclear weapon *science* be finished?” My answer is, “Only after we no longer need a deterrent.” I believe that expanding our knowledge in nuclear weapons science is the best way for the scientists and engineers to develop their own stockpile expertise. Like surgery, the technical aspects of deterrence are learned by both study *and* practice. As we move further from nuclear testing, designer expertise built on direct test experience will eventually disappear. The weapons experts of tomorrow cannot simply admire the work of their predecessors. They must make their own contributions.

The nation’s nuclear designers and engineers spend most of their time looking for and analyzing problems in aging systems. This is necessary and important work. As the weapons teams that have devoted their careers to preserving the past progress through their careers and ultimately retire, I am concerned that we may find ourselves short on the expertise needed to meet the deterrent challenges of the future. At some point in the future we will retire our current weapons systems. Even with the best of care, they are not immortal. If a nuclear deterrent is still required,

the weapons systems will, inevitably, be different than those of the past. We must ensure that the scientists and engineers who then carry the responsibility for the deterrent have had the breadth of experience – experience gained through advancing scientific understanding and design practice rather than additional nuclear tests – to provide for the nation’s needs in a technical environment that will be substantially different than today.

I believe that the scientific and engineering talent resident at each of our laboratories offers high value to this country. Many of our weapons experts’ primary responsibilities are in direct support of the stockpile. When needed, they are also the first-line experts in analyzing the weapons activities of other countries. By investing in the people, tools, and infrastructure at the labs the nation benefits from expertise in nuclear, chemical, and biological weapons; improvised explosive devices, and space situational awareness to name a few.

Conclusion

In conclusion, I understand the budget situation we face. Stability, flexibility, and predictability help me manage the Laboratory. These are three things that I don’t have when operating under a continuing resolution (CR). Because we have operated under CRs of various lengths over the last several years, I have nearly exhausted my flexibility in managing during these unstable periods of time. Should we have to operate in another full year CR in FY14, I believe significant negative impacts to the Laboratory are possible going forward.

Faced with near and long-term budgetary uncertainties, I will continue to do everything in my power to meet our mission commitments within these constraints. However, I believe that challenging long-standing assumptions and reexamining what we have believed to be requirements may produce options for the stockpile that we have not yet imagined – options that may be more attractive in the current fiscal environment.

Mr. Chairman, some may ask, “Is the path we’re on feasible?” I believe that it is; however, in practice, it is going to be an expensive path. The national laboratories – the national treasures that my colleagues and I have the privilege to lead – are here to provide technical options. I submit that now is the time to create paths that sustain the deterrent while challenging the ways of the past decades.