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NUCLEAR BAILOUT: A CRITIQUE OF THE DEPARTMENT OF ENERGY'S PLANS FOR A NEW NUCLEAR WEAPONS COMPLEX

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for the Department of Energy's "Complex Transformation" Plan

EXECUTIVE SUMMARY

The Department of Energy (DOE) plans to undertake an extensive, multi-billion dollar investment in new nuclear weapons facilities and new nuclear warhead designs. The initiative, known as "Complex Transformation," is unnecessary on strategic and technical grounds, not to mention exorbitantly expensive. The various plans being considered by the DOE have more to do with bailing out the nuclear weapons industry than they do with determining what size complex makes sense in an era of nuclear arms reductions. At a minimum, current proposals should be put on hold until the new president taking office in January 2009 has a chance to enunciate a new nuclear policy. That new policy should then guide any initiative to reshape the nuclear weapons complex.

COSTS HIGH, SAVINGS UNCERTAIN

- Even the DOE's own estimates suggest that the Complex Transformation initiative will cost well over $200 billion over the next two decades, or one-third more than previous estimates.

- According to the DOE's economic consultants, investments in upgrading the weapons complex may not be recouped through savings from more efficient operations until as late as *2060*, more than 50 years from now. This suggests that a more affordable, less investment intensive approach to sustaining the complex—such as a "curatorship" option that would only replace weapons components as needed and would forego any new warhead designs—makes far more sense than any of the DOE's current proposals.

ARGUMENTS FOR COMPLEX TRANSFORMATION ARE DEEPLY FLAWED

- The Department of Energy (DOE) argues that the current nuclear weapons stockpile is aging to the point that existing weapons could become unsafe and unreliable. In fact, a Department of Energy funded study by the highly regarded scientific expert group JASON suggests that current warheads will be reliable for at least another *75 to 100 years*.

- Similarly, DOE's argument that nuclear weapons facilities are too old is misleading. Although some of the buildings were built decades ago, much of the equipment—which is the heart of the nuclear weapons complex—has been regularly repaired, upgraded or replaced.

- If the main issue is to retain "core competencies" for the design and production of nuclear weapons in case of a renewed nuclear arms race, a 'curatorship approach' (cited above) is more than sufficient for the job. Yet DOE has explicitly refused to examine the curatorship option as one of the approaches analyzed in its environmental impact statement for the Complex Transformation initiative.

STRATEGIC VISION MISSING IN ACTION

- At a time when distinguished foreign policy experts from Henry Kissinger and George Shultz to William Perry and Sam Nunn are calling for a "world free of nuclear weapons," the Department of Energy is not seriously exploring what deep cuts or outright elimination of nuclear weapons would mean for the future of its weapons complex.

- A U.S. plan to design and build new nuclear weapons and new nuclear weapons factories could spur nuclear proliferation by reducing Washington's leverage in persuading countries like Iran and North Korea to forego or roll back their own nuclear programs.

INTRODUCTION

The Bush administration's 2001 Nuclear Posture Review called for a "new triad" to replace the traditional nuclear triad of nuclear weapons delivered from the ground, from the air, and from the sea. The new triad is to consist of a variety of long-range strike systems, both nuclear and non-nuclear; a "responsive infrastructure" able to design and build new nuclear weapons as needed; and a capability to defend against nuclear attack. The purported advantage of the new triad concept is that it will provide future presidents with the "flexibility" to increase, decrease, or reshape the nuclear arsenal as needed in response to new developments.[1]

In conjunction with this new nuclear strategy, the Department of Energy's National Nuclear Security Administration (NNSA) has embarked upon a "Complex Transformation" initiative. Complex Transformation calls for upgrading existing nuclear weapons facilities, building new ones, and designing, producing and deploying new nuclear warheads. The Department of Energy (DOE) has supplied no comprehensive cost estimates for the various plans it may pursue in the name of transformation. The information that does exist raises more questions than it answers.

As explained below, two incomplete studies commissioned in the context of the Supplemental Environmental Impact Statement (SPEIS) suggest that the costs of any of the DOE's current options for Complex Transformation will exceed $200 billion between now and 2030.[2] This is at least one-third more than the estimate of more than $150 billion over the next two decades that has thus far served as the touchstone for public discussions of the costs of Complex Transformation.[3]

Beyond the question of cost, Complex Transformation is premature. The next president should have the opportunity to review the initiative to determine if it fits into the revised U.S. nuclear posture likely to emerge in the first few years of a new administration.

There is a growing consensus among former top government officials—affirmed by presidential candidates Barack Obama and Hillary Clinton—that the United States should be moving towards deep reductions and/or eventual elimination of nuclear weapons. The call for a "world free of nuclear weapons" has been led by former Republican Secretaries of State George Shultz and Henry Kissinger, former Clinton administration Secretary of Defense William Perry, and former Senate Armed Services Committee chairman Sam Nunn.[4] Their proposal is also supported by a roster of distinguished experts, including several former arms control officials from the Reagan administration. A nuclear-free posture, if adopted, would obviate the need for a nuclear weapons complex of the size and scope of the current one, much less a modernized version of same.

Policy questions aside, a major investment in retooling the nuclear weapons complex is unnecessary on technical grounds. A primary rationale for the project was the need for new plutonium "pits"—the triggers for a hydrogen bomb explosion. This claim has been refuted by JASON, a panel of experts regularly consulted by the Pentagon and the Department of Energy. JASON has suggested that "most weapons types in the stockpile have credible minimum lifetimes in excess of 100 years."[5] Allowing for the fact that some of the pits currently in service are as much as 25 years old that would put the useful life of current warheads at 75 to 100 years or more.

At a minimum, the Complex Transformation plan should be put on hold pending guidance from a new administration; and the Supplemental Environmental Impact Statement (SPEIS) should be expanded to cover options that involve scaling back the research and production capacities of the nuclear weapons complex in line with possible movement towards a world in which nuclear weapons stockpiles are radically reduced, if not eliminated altogether. A new SPEIS process should also address the possibilities for providing new missions for existing facilities that may no longer be needed in the context of a nuclear weapons complex that is reduced in size and scope.

WHY COMPLEX TRANSFORMATION?—ASSESSING THE RATIONALES

The National Nuclear Security Administration's rationale for investing tens, if not hundreds, of billions of dollars in building a new nuclear weapons complex is summarized in the Draft Complex Transformation Supplemental Environmental Impact Statement as follows:

> "In the 1996 SSM PEIS [Programmatic Environmental Impact Statement], no new production facilities were proposed. The enduring types of weapons in the

> stockpile were at the mid-point of their anticipated design life of 20-25 years, and the life extension plans for the enduring weapons were not yet fully developed. The weapons in the stockpile are now a decade older than when the SSM PEIS was prepared. Because the U.S. will maintain a nuclear deterrent in the form of a safe, secure, and reliable stockpile with the smallest number of weapons possible, NNSA needs to preserve its core competencies in nuclear weapons, and invest in some replacement nuclear facilities for research and production. Because these major nuclear facilities are more than 50 years old, the ability to keep them safe, secure, and performing within realistic economic constraints is declining."[6]

This section will address the rationales set out in the summary statement in turn.

ARE CURRENT WARHEADS "TOO OLD"?

The NNSA summary engages in a sleight-of-hand which might be interpreted by some readers as suggesting that the useful life of warheads now in the U.S. stockpile could be about to run out (if, as noted "weapons in the stockpile were at the mid-point of their design life of 20-25 years" in 1996). There have been two major developments since 1996 that suggest that current warheads can be maintained in a safe and reliable condition for decades to come, without the need to design or build new ones:

1. The elite Pentagon scientific advisory group JASON has indicated that the plutonium "pits"—the devices which trigger the explosion of a hydrogen bomb—will be workable for over 100 years. If, as NNSA suggests, current warheads are at most about 25 years old, that would mean that they will continue to be reliable for at least 75 to 100 years. This contrasts sharply with NNSA's plans, as of last year, to produce its first new "Reliable Replacement Warheads" (RRWs) as soon as 2012, or less than five years from now.[7]

2. The Life Extension Programs (LEPs) referenced by NNSA have been up and running for over a decade: hundreds of millions of dollars have been spent to ensure that existing warheads can extend their useful lives for decades beyond current projections. As noted in DOE's FY2009 budget justification document, Life Extension Programs involve "replacement of obsolete equipment" as needed.[8] A scaled back version of the LEP approach should be more than adequate to sustain a reliable stockpile. Proposals for designing and building an entirely new Reliable Replacement Warhead (RRW) are not only unnecessary, but they may actually result in a less reliable stockpile absent new nuclear testing.

So, not only are the central components of the warheads in the current U.S. stockpile likely to be reliable for decades to come, but hundreds of millions have been spent to extend their useful lives by refurbishing or replacing equipment deemed "obsolete." Thus, despite the impression left by the NNSA's summary of the need for Complex Transformation, there is absolutely no urgency to design or build new nuclear warheads.

ARE CURRENT NUCLEAR WEAPONS FACILITIES "TOO OLD"?

The NNSA justification for Complex Transformation references the fact that the major facilities in the nuclear weapons complex are "over 50 years old." But NNSA makes no persuasive case as to why this in and of itself would justify building new facilities across the board. The fact that the *buildings* may be 50 years old does not account for the fact that the *equipment* has been constantly replaced, maintained and upgraded during this same time frame. So, the assertion of 50 year old facilities is misleading, and tells us nothing about what is actually needed to maintain a substantially reduced arsenal.

Restructuring current buildings to reduce the areas that contain plutonium or highly enriched uranium (referred to in NNSA parlance as Special Nuclear Materials, or SNMs) seems to make good sense from the point of view of safety and security. On the other hand, building entirely new facilities for enriching uranium, producing plutonium "pits," and fabricating the non-nuclear components of nuclear warheads is not justified.

HOW LARGE A COMPLEX IS NEEDED TO SUSTAIN THE 'CORE COMPETENCIES' NEEDED TO MAINTAIN A RADICALLY REDUCED NUCLEAR ARSENAL?

The asserted need to build a new nuclear weapons complex and to develop the capacity to design and produce new nuclear weapons is tied in part to the argument that it will help maintain the "core competencies" needed to design, produce, and sustain nuclear weapons for the foreseeable future. The assumption underlying this argument is that it will require eight major production, research and testing sites and tens of thousands of workers to retain these "core competencies," even in a world in which an arsenal of as little as 200 nuclear weapons (compared to current U.S. deployed warheads of over 5,100) will be more than adequate to deter any other nation from using nuclear weapons against the United States or one of its allies.[9]

NNSA has not made the case that a complex approaching current levels would be needed to sustain "core competencies" in nuclear technology in an environment characterized by a much smaller arsenal. The agency needs to go back to the drawing board and figure out which facilities can be de-activated and restarted as needed, which ones might need to operate at reduced levels, and how many personnel it would take to operate this smaller complex. This should serve as a baseline for determining how many individuals will be needed to sustain a level of "core competency" needed to sustain this smaller arsenal. In addition, training programs for scientists and engineers could be developed to familiarize them with the basic operational and design features of nuclear warheads so that they could be called upon if needed. These skilled workers could constitute a sort of "reserve force" for the nuclear weapons complex. For an outline of a sensible approach that would meet these requirements, see the discussion of the "curatorship option" below.

HOW MUCH WILL IT COST?

THE SECRETARY OF ENERGY'S ADVISORY BOARD (SEAB) ESTIMATE:

As noted above, the most frequently cited estimate to date for the costs of modernizing the nuclear weapons complex comes from a July 2005 "Report of the Nuclear Weapons Complex

Infrastructure Task Force" produced by the DOE's Secretary of Energy Advisory Board. The task force looked at three basic cases:[10]

1. A "baseline case," which simply involves extending the current nuclear weapons complex budget over a 25 year period, allowing for inflation. This case was projected to cost $170 billion over the relevant period.

2. A "Complex Transformation in place" case, which involves keeping existing facilities in the complex as they are, while producing a new warhead, the Reliable Replacement Warhead (RRW). This case is projected to cost $175 billion over a 25 year period.

3. A "revolutionary Complex Transformation" option, involving the creation of a Consolidated Nuclear Production Complex (CNPC) and consolidation of all Special Nuclear Materials (plutonium and highly enriched uranium) in one location. This option would include closures of key facilities and significant reductions of the work force involved in maintaining the weapons complex. This case is estimated to cost $155 billion over 25 years, and is the one generally referred to as the "cost" of Complex Transformation.

There are numerous problems with the SEAB estimates. First and foremost, they were not done by independent analysts and utilized an untested methodology. As the task force report itself notes, "several sets of assumptions…were examined in a simplified manner, supported by calculations from a pair of relatively new, *and as yet unvalidated* financial analysis tools provided by LANL [Los Alamos National Laboratory] and LLNL [Lawrence Livermore National Laboratory]."[11] *[Emphasis added]*

Since Los Alamos and Livermore are two of the three nuclear weapons laboratories that could win or lose funding and influence based on which Complex Transformation options are chosen, using their methodologies to assess the costs of different paths involves a potential conflict of interest. And the fact that the methodology had "yet to be validated" suggests that the $155 billion figure should be set aside in pursuit of a more accurate estimate.

The results of this flawed process raise further questions about its validity and applicability. For example, the assumption that the "radical transformation" option would be cheaper than either the status quo option or transformation in place is based on the notion that an additional $10 billion would have to be spent in the first ten years to yield $25 billion in savings over the next fifteen.[12] But the expenditure portion of the ledger—destroying old facilities and building new ones, building and siting new equipment, all the while operating parts of the complex in place—is much less speculative than the savings portion. If anything, it can be assumed that the new investment portion of transformation will cost more than expected, given the DOE's track record of cost overruns on major projects and facilities.

As for the purported savings, the SEAB model asserts that they will come from the extent to which it will be necessary to maintain Life Extension Programs (LEPs); the alleged greater efficiencies involved in having one large Consolidated Nuclear Production Complex versus a series of smaller ones at dispersed sites; reduced costs of physical security inherent in a more

concentrated weapons complex; and "efficiencies realized within the Complex as the result of improved contractual and business practices."[13] Each of these proposed sources of savings raises questions. One massive nuclear weapons production complex may or may not be substantially cheaper to operate than a series of smaller sites. The case for substantial cost savings has not been proven, although it is likely that to the extent that it involves less total floor space and reduces the need to transport Special Nuclear Materials and other bomb components, a modernization plan could realize some savings. Since physical security has been inadequate under current arrangements, there may not be net savings relative to current costs if investments in more effective security measures are made. And there is no reason that "improved contractual and business practices" could not be pursued with or without a "radical transformation" of the nuclear weapons complex.

Finally, the SEAB estimate does not cover the full range of possible options for Complex Transformation. A "standby" or "curatorship" approach, as advocated by former Office of Management and Budget analyst Robert Civiak, would either mothball key facilities or operate them at much lower levels than currently, while maintaining sufficient (but much reduced) staff to maintain the complex in a "ready state" adequate to deal with any unexpected global developments.[14] Yet given its narrow mandate, the SEAB report does not attempt a cost estimate for such a case. Similarly, the "radical transformation" option involving substantial consolidation of nuclear weapons production capabilities in one site is not one of DOE's current preferred options, so even the admittedly flawed estimate for that approach is not directly relevant to Complex Transformation options that are currently under serious consideration.

ESTIMATES COMMISSIONED AS PART OF THE CURRENT SPEIS

The Supplemental Programmatic Environmental Impact Statement (SPEIS) for the Complex Transformation initiative includes three supplemental reports by TechSource Incorporated that address the costs of a number of different options. The primary study, which covers Special Nuclear Materials and Weapons Production, suggests new net costs of $40 to $60 billion between now and 2030, depending on which consolidation and modernization option is chosen.[15] Assuming that most or all of the purported operating efficiencies will not fully come into play until these initial investments are completed, this would put the total costs of transformation at $210 to $230 billion through 2030, or up to 50 percent higher than the SEAB estimate. Or, as the TechSource report puts it,

> "For the 2030 calculation, the general trend is increasing costs for increasing levels of consolidation. The required near-term investment—for high new construction costs and long construction times—is not yet offset by the savings realized in the long term through consolidation…in the 2060 case, the savings from consolidation tend to offset the initial investments… Nuclear consolidation, therefore, only makes financial sense when viewed as an investment with a very long-term payback.[16]

In short, under virtually any of the variants of Complex Transformation being considered by the NNSA, there will be substantial additional costs between now and 2030, with potential offsetting savings not coming fully into play until as late as 2060. Even then, the TechSource report

indicates that by 2060 the savings "tend to" offset the investments involved. This suggests that *even fifty years from now* there is a chance that the initial costs of Complex Transformation may not be recovered in the form of increased operating efficiencies.

In addition to the costs of building new facilities while simultaneously operating the current ones, there are considerable upfront costs for transportation of plutonium and highly enriched uranium from the Pantex plant in Amarillo, Texas and the Y-12 plant in Oak Ridge, Tennessee to a single site, as called for in the majority of the Complex Transformation options. As the TechSource study notes, "The financial model assumes it will take about 10 years to completely transfer either of these stored quantities of SNM, thus greatly reducing the ability to close either site in a timely manner. An additional transition expense of keeping the sites open for extended times during the transfers would also be incurred."[17]

In its concluding sections, the TechSource study notes that the current nuclear weapons complex can sustain a stockpile of 1,700 to 2,200 (as called for in the Strategic Offensive Reductions Treaty between Washington and Moscow) *and* produce Reliable Replacement Warheads (RRWs) to replace existing warheads in the stockpile. Given that there is a strong likelihood that the U.S. arsenal will be reduced to levels below 1,700 by 2030, much less 2060, the existing complex—with upgrades and renovations as needed—should be able to sustain a reliable and safe arsenal for decades to come. As for Complex Transformation options, all of them share one central feature—substantial upfront costs in exchange for speculative savings that may not even be realized for 20 to 50 years.

CONCLUSION

Given the increasing realization that nuclear weapons have no constructive role in any likely defense scenario going forward, there are serious questions as to whether a major modernization plan—including new weapons factories and new warheads—is necessary at all. This argument is compounded by the fact that there is a consensus among experts that current nuclear warheads will remain reliable for at least 75 to 100 years, thereby precluding the need for a "Reliable Replacement Warhead." Finally, if plans for Complex Transformation do go forward, they will involve tens of billions of dollars in additional costs over the next two decades, with no offsetting savings until as late as 2060. For all of these reasons—strategic, technical, and economic—the Complex Transformation plan should be shelved in favor of a more affordable, "curatorship" approach designed to maintain a smaller stockpile while sustaining skills needed to resume weapons production should it become necessary. This approach would involve minimal new investments, and would be much less provocative than a plan to upgrade the complex and build new warheads.

ENDNOTES

[1] See "Nuclear Posture Review, Excerpts," January 8, 2002, available at http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm

[2] Author's estimate, based on TechSource Incorporated and LMI Government Consulting, "Independent Business Case Analysis Consolidation Options for the Defense Programs SNM and Weapons Production Missions," Prepared for the U.S. Department of Energy, National Nuclear Security Administration, Office of Transformation, December 2007, p. vi; and Secretary of Energy Advisory Board, "Report of the Nuclear Weapons Complex Infrastructure Task Force: Recommendations for the Nuclear Weapons Complex of the Future," Final Report, July 13, 2005, appendix E, pp. E-1 and E-2. The Secretary of Energy Advisory Board (SEAB) report estimates the cost of running the nuclear weapons complex at current levels without major changes at $170 billion through 2030. The TechSource/LMI analysis indicates that an additional $40 to $60 billion will need to be invested for any of the transformation options under consideration and that savings from operating efficiencies are not likely to fully kick in until as late as 2060. This suggests that the total costs of transformation between now and 2030 could be in the range of $210 billion to $230 billion. Even allowing for possible operational efficiency savings of $10 billion—an optimistic assumption—this would put the total cost at $200 billion to $220 billion.

[3] See, for example, United States Government Accountability Office, Testimony Before the Subcommittee on Energy and Water Development, Committee on Appropriations, House of Representatives, Statement of Gene Aloise, Director, Natural Resources and Environment, "Nuclear Weapons: Views on Proposals to Transform the Nuclear Weapons Complex," April 26, 2006, p. 13, which cites an estimate of $155 billion by the Secretary of Energy Advisory Board (SEAB) Task Force (cited above) "to carry out the task force's recommendations" on consolidation of the complex. The SEAB approach represents one of the more extensive consolidation plans under consideration under the DOE's Complex Transformation Supplemental Programmatic Environmental Impact Statement (SPEIS), but it is not a preferred approach.

[4] George Shultz, Henry Kissinger, William Perry, and Sam Nunn, "Toward a Nuclear Free World," Wall Street Journal, January 15, 2008.

[5] The Mitre Corporation, "Pit Lifetime," Report JSR-06-335, January 11, 2007, p. 19.

[6] U.S. Department of Energy, National Nuclear Security Administration, "Draft Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS, DOE/EIS-0236-S4)," Introduction, p. 1–4.

[7] Office of Chief Financial Officer, National Nuclear Security Administration, FY 2008 Budget Request, Volume 1, DOE/CF-014, February 2007, p. 82. The budget document refers to an "objective for RRW First Production Unit of 2012 but no later than 2014."

[8] Office of Chief Financial Officer, National Nuclear Security Administration, FY 2009 Budget Request, Volume 1, DOE/CF-024, p. 76.

[9] For an overview of the state of the U.S. arsenal, see Robert S. Norris and Hans M. Kristensen, "The U.S. Nuclear Stockpile, Today and Tomorrow," Bulletin of the Atomic Scientists, Vol. 63, No. 5, September/October 2007, pp. 60–62.

[10] All three cases are described in Secretary of Energy Advisory Board, Report of the Nuclear Weapons Complex Infrastructure Task Force, "Recommendations for the Nuclear Weapons Complex of the Future," July 13, 2005, Final Report, Appendix E, pp. E-1 and E-2.

[11] Ibid, Secretary of Energy Advisory Board, Appendix E, p. E-1.

[12] Ibid, p. E-2.

[13] Ibid, pp. E-1 and E-2.

[14] Dr. Robert Civiak, "Managing the Nuclear Weapons Stockpile: A Comparison of Five Strategies," a report for Tri-Valley CAREs, July 2000, pp. 11–12.

[15] TechSource and LMI Incorporated, op. cit., note 2, p. vi.

[16] Ibid, p. vii.

[17] Ibid, p. ix.