



# Los Alamos Study Group

*Nuclear Disarmament • Environmental Protection • Social Justice • Economic Sustainability*

September 26, 2014

## Memorandum

To: The [Commission to Review the Effectiveness of the National Energy Laboratories](#) (CRENEL)

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From: Greg Mello, Los Alamos Study Group

## Re: The Future of the National Nuclear Security Administration (NNSA) laboratories

Dear Commission members –

The following are my initial comments on the future of the three NNSA laboratories for your consideration. The three labs are of course just a subset of your broad charter, which concerns all seventeen Department of Energy (DOE) labs. My experience is limited to these three.

These comments are just a sketch, with a minimum of citations, as time is very limited for us here. I can be reached by phone at 505-265-1200 (office) or 505-577-3366 (cell), and email ([gmello@lasg.org](mailto:gmello@lasg.org)).

Most of these comments pertain to the two physics labs only, Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL). I believe these laboratories are in substantial part, but not entirely, redundant both with respect to each other and with respect to other DOE laboratories and other laboratories and research institutions. Peer review is good, but not excessive duplication of resources and expenses, which leads to entrepreneurial mission inflation.

In addition to these redundancies I believe some of these two labs' nuclear weapons projects and programs provide relatively little value. For some programs and projects there may have been more value when they began than at present; i.e. the scientific questions involved have been sufficiently resolved. In other cases there was insufficient value, in my opinion, from the beginning.

I have been professionally involved in issues related to the future of what are now the NNSA laboratories sporadically since 1989, when my colleagues and I founded this organization to foster public dialogue regarding the future of LANL in particular. Over the past 25 years my colleagues and I have organized hundreds of public meetings, written thousands of comments, and conducted hundreds of briefings and meetings on Capitol Hill and elsewhere on issues related to the future of the NNSA weapons complex and the three NNSA labs in particular. I was an invited participant in the Galvin Panel process. In the early to middle 1990s I consulted with other organizations analyzing possible NNSA laboratory futures. My academic training was in the sciences, engineering, and environmental policy (Harvey Mudd College), and later in regional planning (Harvard). I was a Visiting Fellow in Princeton University's Science and Global Security Program in 2002. Since 1992 I have been the executive director of this organization, about which more can be found at our [web site](#).

A “selected” list of lab studies over the past 20 years (mentioned in [the presentation of Mark Taylor, Susannah Howieson, and Julian Zhu](#) at the first CRENEL meeting) contained fifty-five entries.<sup>1</sup> This fact

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<sup>1</sup> <http://energy.gov/labcommission/downloads/presentation-introduction-current-prior-studies-doe-laboratories>

alone suggests widespread acknowledgement of problems, or else widespread perception of underachievement. Evidently the management of these laboratories is a fraught subject.

Speaking now of the NNSA laboratories only, there has been little major change in management, apart from full privatization at the two physics labs, despite all these studies, suggesting politically-derived stasis. And privatization has not improved anything, as far as we can tell – though it may be that small fiascos and problems are hidden better, many potential troublemakers took early retirement when the management and operating (M&O) contractor changed, and the subsequent workforce that was hired has a more corporate character. As one senior LANL scientist explained to us, since privatization there are twice as many managers as under UC, and they are paid twice as much. This latter phenomenon spreads the entire salary scale upward, to the point that there are now thousands of mid-career scientists and engineers at these labs who are paid more than federal cabinet secretaries and the Joint Chiefs of Staff. To this problem must be added the additional fiscal burden of gross receipts taxes, high management fees, and setting up the new pension funds. Meanwhile, fiascos involving billions of dollars (in total) continue apace.<sup>2</sup> No, management of the physics labs has not improved with privatization.

The same vague euphemisms and stale clichés reappear time after time in reports about the labs and in official NNSA and DOE pronouncements, and the same old myths are rehearsed. The result is: not much. There is very little reform. So the problem is *not* one of politics maintaining the status quo in the face of clarion calls for reform. There have been no clarion calls for reform. The intellectual echo chamber remains closed and the reform process suffocates. An absence of vision and insight causes busy people to yawn and move on to more interesting things.

In some cases review committees are extensively lobbied by the laboratories to produce the outcomes they want, as was the case in the (worthless) 2013 study of the NNSA lab by a committee of the National Academy of Sciences (NAS). In other cases people whose careers, identities, and material interests are entangled with the labs are salted into the mix directly.

A detailed review of prior studies is beyond the scope of these comments.

Unfortunately, we must all take up the future of the NNSA laboratories in a state of ignorance, because these labs are opaque. Program names and labels are painted on but the reality behind the walls is different than described. In general, opacity has increased over time. As NNSA lab budgets have grown in the post-Cold War years, their budgets and programs have become less precisely described. Large, vague budget lines are in vogue.

In addition, funds from different programs and line items are mixed to a great degree, more than most suspect. For example burden rates for construction management by the management and operating (M&O) contractor can exceed 100%, more than doubling the price of construction while providing a large source of reprogrammable funds that lack effective oversight or alignment with congressional guidance. Overhead costs for Work for Others (WFO) can be and sometimes are distributed across DOE line items, meaning that DOE has at times substantially subsidized non-DOE programs. The Government

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<sup>2</sup> An editorial from an unusual source on LANL institutional incompetence: "[Bureaucratic ineptitude entrenched at LANL](#)," *Albuquerque Journal* Editorial Board, Oct. 6, 2013.

Accountability Office (GAO), congressional committees, the DOE Inspector General, and I strongly suspect even NNSA and DOE themselves do not know how the funds appropriated to these laboratories are being spent.

In another kind of opacity, one Los Alamos Field Office Manager told me he was not allowed to know the nature or purpose of a new building being built on site. He was not sworn into that particular special access program (SAP).

It is very common or even normal for scientists deeply involved in lab programs to harbor misinformation as to the policies behind them. This is true for managers, even senior managers, as well. The first victims of propaganda are those who produce it. It is simply impossible for busy managers to understand everything.

Control of information is so extensive, dissembling so common, and the complexity of programs and issues so great that it is impossible, at this point, to “fine-tune” any sort of normative future for these labs. The complexity and diversity of activities at LANL in particular, especially when added to LANL’s geographic dispersion, makes it very difficult for LANL and DOE officials to manage that lab. For those of us on the outside any *a priori* detailed program review is not possible.

Given the opacity-and-complexity problem in its various dimensions, program review, declining budgets, increasing transparency and accountability, and management reform, along with programs for worker separation, training, and transition, must be seen as a recursive, interdependent process. *It begins with the decision to cut budgets and low-hanging program fruit.* One must start somewhere that’s where – with cutting budgets.

At LLNL, make the decisions to end DOE support of NIF, and to close Site 300. At LANL, make the decision to close LANSCE. Stop the mindless supercomputing race in the Advanced Simulation and Computing (ASC) program. Stop pursuing nuclear fusion. Stop the rush to produce plutonium dioxide at LANL for a Mixed-Oxide Fuel (MOX) program that is behind schedule and should be canceled in favor of simpler, cheaper disposal methods in any event.

After that initial scrub and as real management reforms are enacted, some of which will involve greater transparency, reviewers will begin to have a better idea of where the remaining money actually goes and of the relative value of the programs remaining.

Let me be as clear as possible about this. The first step is not any kind of detailed program review or detailed management improvement, or any fine-grained analysis or recommendations of any kind. Many of us have done this. Its time is past. After dozens of prior studies and more than two decades of post-Cold War experience, coarse review is adequate at this point and indeed all that is possible given the above opacity, dissembling, and complexity.

The first step is to make the decision to cut the NNSA lab budget, and then to look for the program cuts by which this can be done. CRENEL should recommend a process as well as an outcome, and these should be the first steps in that process.

I suggest that the two physics labs combined budget should be cut by very roughly 50% over four years. Cuts that are too steep will create too much havoc, but cuts not steep enough will not create enough havoc and will accomplish nothing. This target, and this rate, is similar to those recommended by House

Science Committee Chairman George Brown in a thoughtful letter to DOE Secretary Watkins written in 1992.<sup>3</sup> The Galvin panel suggested percentage cuts of almost as much, but the labs had already shrunk somewhat over those three years (1992-1995).<sup>4</sup>

Once a downward vector at the NNSA physics labs is chosen by DOE and the Office of Management and Budget (OMB) and included in the upcoming Congressional Budget Request (CBR) and Future Years National Security Plan (FYNSP), subsequent reforms will come easier. The expectation of stasis – of no change – must be broken, and the only way this can happen is fiscally.

The physics labs remain deeply wedded to the Cold War, structurally and ideologically. They will need to be dragged into the today's world. While some of their work is excellent, much of that work, and much of the work they *can* do, will never add value *cost-effectively*.

The NNSA labs have used and will use the power of the annual weapons certification letter to argue against any cuts, essentially blackmailing the government for appropriations. There will never be a better time than now to face that particular bugaboo. It is a hollow threat. The reasons for my confidence are beyond the scope of this letter but the JASONs and many others have adequately addressed the whispered intimations of early mortality in the stockpile repeatedly over the past two decades.

In our experience the fiscal efficiency of NNSA programs at these labs could be easily doubled. Calls for such reforms will not be taken seriously until budgets are clearly coming down, however. Management, and I believe overall also program quality, cannot be very much improved under current levels of largesse. It is a perennial fantasy of DOE that some new management technique or superficial change will be the cure-all needed.

It cannot be emphasized enough that NNSA's mission at the labs relies on more on workforce quality than headcount. Budgets have been set politically for decades now and have little connection with underlying mission. Ways had to be found to absorb the extra money. These institutional patterns have not generally improved mission competence.

Very few of the reforms proposed here are dependent on changes in the stockpile – although politically, stasis in the stockpile does contribute to stasis in the labs. Stockpile stasis should be broken by warhead retirements and not by new design, testing, and production of “interoperable warheads.” Interoperable warheads are nothing more than dangerous and expensive make-work programs with certification problems that may never be resolved (because there will be no testing record to resolve any future disputes). This problem would lurk forever latent, unfixable.

This means the labs will need to go beyond their perennial fixation with nuclear novelty. This can probably only be done within an ethic of government service which no longer exists at these institutions, but which should be re-cultivated. It will require honestly facing U.S. treaty requirements for disarmament. Overall, these labs need to be less grandiose and more mature workplaces. I am tempted to

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<sup>3</sup> In Greg Mello, Lisa Oberteuffer, and Logan Kleier, “[The Conversion Of Los Alamos National Laboratory To A Peacetime Mission: Barriers and Opportunities](#),” at pp. 119-123.

<sup>4</sup> “[Panel Seeks To Streamline Nuclear Labs](#),” Philip J. Hilts, *New York Times*, February 2, 1995. “Among the panel's recommendations were these: [bullet] Shrinking the size of the national labs over several years. Though no figure was given, the labs are so inefficiently managed that 30 to 50 percent of the current costs can be saved by streamlining, Mr. Galvin said.”

expand further on the cultural changes needed and how to achieve them but will leave that for another occasion.

Fortunately, the interoperable warhead issue has been nearly decided by the negative reaction from the Navy. If the high explosive is renewed on the W88 during the Alt 370 Life Extension Program (LEP), assuming also that warhead remains in the stockpile (it is superfluous to the lower-yield W76-1, in our view), the interoperable warhead should be a completely dead issue for the remainder of this decade if not longer.

The proposed B61-12 has little footprint in the physics labs.

The proposed Long Range Stand-Off (LRSO) warhead raises other issues, which are beyond the scope of this memo. But with or without LRSO, there is a nuclear weapons workload gap – chasm would be a better word – at the physics labs and indeed at all three NNSA labs. The two physics labs are much larger than they need to be.

Now follow some broad scenarios for these two laboratories.

You do not see a scenario for complete closure of LLNL here because I do not think that is advisable, for reasons given below. However, complete closure of LLNL would be more advisable than continuing with the current combined lab budgets.

Working through this scenario-based thought experiment has again demonstrated to me the primacy of program and budget cuts over any detailed consideration of “which labs should do what,” i.e. which laboratory should remain primary in the nuclear weapons establishment. Within limits, what both labs do, overall, is much more important than at which lab they do it. History shows that careful thought about what each lab will do will only come after setting and achieving lower budgets.

There is no option shown here involving Security Category I or II special nuclear material, or warheads, in Livermore. The security costs are too great. The future of LLNL is thus bounded in these scenarios, between closure on the one hand and re-introduction of SC I or II nuclear materials on the other, neither of which is recommended.

<b>Normative futures for the two NNSA nuclear physics labs, applicable under all realistic nuclear weapons policies</b>	
<b><u>Scenario One:</u> cut LLNL more than LANL, leaving LLNL as primarily a “peer review” lab; combine LLNL and SNL/CA; keep production under LANL management</b>	
<b>“LANL 1”</b>	<b>“(LLNL + SNL/CA) 1”</b>

<ul style="list-style-type: none"> <li>▪ The primary bases of this scenario have to do with inherent geographic advantages of LANL in SC 1 and 2 special nuclear materials (SNM) as well as high explosives (HE) work.</li> </ul> <p>Key assumptions underlying this scenario might be stated as: 1) weapons surveillance and stewardship cannot be successfully split geographically from that work; 2) key LANL personnel for the B61, W76, W78, and W88 will not migrate to the Bay Area; and 3) LANL can overcome its geographical disadvantages in a) computing, b) personnel recruitment and training, and c) isolation from a vibrant intellectual and technical culture.</p> <ul style="list-style-type: none"> <li>▪ To a first approximation, aim to cut the overall DOE LANL budget by roughly 50% over four years. This will leave a generously-sized laboratory focused on Weapons Activities (WA) missions but without the today's rococo touches, unfocused mission elements, boutique science, and useless overhead. Cuts of roughly \$950 M (using the estimated FY14 spending as a baseline) would come from, roughly: <ul style="list-style-type: none"> <li>▪ \$25 M energy programs</li> <li>▪ \$75 M science programs</li> <li>▪ \$25 M fissile materials disposition</li> <li>▪ \$75 M other defense nonproliferation (DNN)</li> <li>▪ \$750 M WA; these cuts, not specified in detail here, might be concentrated in but not be limited to the WA science campaign, inertial confinement fusion (ICF), advanced simulation and computing (ASC), and readiness in technical base and facilities (RTBF).</li> </ul> </li> </ul> <p>See below for more on how management reforms could contribute to these economies.</p> <p>Bear in mind that through internal "taxes" a large</p>	<ul style="list-style-type: none"> <li>▪ To a first approximation, cut the overall DOE LLNL budget by 60%. Within this, cut WA by 55% or about \$550 M. LLNL is already relatively focused on WA and this focus would be tightened further in this plan, essentially leaving only WA at a much smaller LLNL, focusing on peer review and unique LLNL weapons capabilities.</li> <li>▪ Alternatively, DNN could be left as well. As also noted below, the LLNL <i>site</i> (i.e. LLNL and a redevelopment authority) could try to retain some of what is now WFO at LLNL. The new authority would be liberated from NNSA overhead and therefore be in a better competitive position.</li> <li>▪ Institutionally, SNL Livermore would be consolidated into LLNL in this scenario. The resulting much smaller lab would conduct peer review of both weapons science and weapons engineering.</li> <li>▪ Right now, make NIF a user facility, carrying its full overhead burden for users, or else declare a little success and close it. The non-weapons (i.e. energy) premises of the ICF program are bogus. The pure science is unaffordable for DOE and probably everyone. The weapons uses of NIF are relatively unimportant, not cost-effective, speculative, or combinations of all these. Like Seymour Sack and C. Paul Robinson said, as reported in mainstream media articles of circa 20 years ago, I also do not think the training value of NIF is worth the very expensive candle not just of NIF but of LLNL as a Cold War sized lab, especially in an era of no new weapons designs.</li> <li>▪ Keep Superblock (Building B332 and ancillary facilities) for AC and plutonium metallurgy within its existing Security Category (SC) 3 designation (<math>\leq 400</math> g pure Pu; <math>\leq 2,000</math> g high-grade materials; <math>\leq 16,000</math> g low-grade materials) or else as a SC 4</li> </ul>
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part (but unknown to GAO after 20 years of study) of every appropriated dollar is apparently spent on distributed overhead at LANL and the other two laboratories. This overhead includes general and administrative (G&A) expenses of all types (some well-justified and some not), students (too many) and post-docs (too many, given future lab size), LDRD (too large and perhaps entirely unjustified), fee (too large – at-risk fee should be entirely eliminated and overall fee dropped to a nominal level, as Acting Administrator Bruce Held suggested, the so-called “public interest model”), gross receipts taxes (which could be eliminated by making the contractor nonprofit, or by removing the contractor altogether and federalizing the site), and subcontractor overhead and profit (there are too many subcontractors in any case). Defined-benefit pensions of employees who are not retained until retirement will be less than currently envisioned.

These cuts leave a \$980 M LANL.

- Right now, NNSA could make the decision to close down LANSCE, which is near the end of its (already-extended) life rather than embark on a very expensive program of life-extension and upgrade. NNSA should abandon the unnecessary MaRIE project.
- Right now, NNSA can decide to use PF-4, after full seismic, ventilation, and related safety upgrades, for all future high-MAR (material at risk) plutonium pit production activities, including metallurgical characterization (MC). Do not use PF-4 to process plutonium for disposition; other better facilities exist for that purpose if it is justified at all. Use PF-4 and other existing LANL facilities to maintain at least a minimum capacity in all supporting analytical chemistry (AC) activities. Continue and/or establish higher-capacity AC, which would also include peer review AC, at LLNL and/or the Savannah River Site (SRS) F/H Laboratory,

facility ( $\leq 200$  g metal;  $\leq 400$  g high-grade materials;  $\leq 3,000$  g low-grade materials).<sup>5</sup> Even SC 4, less than today’s level, is adequate for AC capacity augmentation for 80 pits per year. Keeping Superblock open at SC 3 especially would provide needed peer review of Pu metallurgy and contingent AC capacity.

- LLNL might not have any lead warhead responsibility under this plan, but alternatively LLNL might retain lead responsibility for one warhead.
- It might be difficult to induce key LLNL personnel to move to the LANL area, which contributes to the desire for a scenario 2. It is possible that personnel recruitment and retention considerations will substantially drive the question of LANL/LLNL balance.
- As noted below, Site 300 should close and, where adequately remediated, include an extensive renewable energy generation facility.
- As practical the LLNL site footprint should be consolidated into a physically focused campus including Superblock, leaving much of the site for D&D or commercial reuse.
- The corporate identity of (LLNL+SNL) and its board of directors should be entirely separate from LANL and SNL, assuming the labs remain GOCOs. Its director should not be an officer. It should not make profits or be awarded fees.
- The remainder of the former LLNL/SNL site should be reorganized under an entirely different, new regional or state authority with non-DOE core funding. D&D and continuing EM responsibilities would remain with DOE. Some non-weapons work of LLNL and SNL might, after successful competition, remain at the site under different management, and involving some existing personnel, but this cannot be assumed. The new non-NNSA

<sup>5</sup> See more detailed discussion in [U.S. Nuclear Weapon “Pit” Production Options for Congress](#), Jonathan E. Medalia, CRS, Feb 21, 2014, p. 39.



<p>which will not require increasing security or hazard categories at these sites.</p> <ul style="list-style-type: none"> <li>▪ Pu-238 missions in PF-4 need an analysis of alternatives (AoA) for their geographic location that includes the Savannah River Site (SRS) and the Idaho National Laboratory (INL) as well as LANL.</li> <li>▪ Right now NNSA can and should decide to not build plutonium modules, saving billions in construction, operation, and future D&amp;D. No further consideration of modules is needed at this time given the fat in PF-4 missions, floor space, MAR, and the non-existent pit production evening workload (i.e. lack of multi-shift operations), not to mention the unresolved uncertainties in mission requirements for pit production.</li> <li>▪ Peremptorily end, or else safely accelerate and complete, the Confined Vessel Disposition (CVD) project. Set up a full suite of AC capability outside the Chemistry and Metallurgy Research (CMR) building as soon as possible. With these actions completed, close, dismantle, and dispose (D&amp;D) of CMR.</li> <li>▪ Accelerate D&amp;D of the current 300,000 sq. ft. of empty laboratory buildings at LANL.</li> <li>▪ Review remaining infrastructure for closure and D&amp;D.</li> <li>▪ Review all non-nuclear facilities at LANL for seismic compliance.</li> <li>▪ Complete necessary upgrades of nuclear facilities and eliminate the legally-dubious Justifications for Continued Operations (JCOs), which have become an excuse for extensive maintenance deferral.</li> <li>▪ End remaining biological defense and other biology programs, transferring them to other DOE and other laboratories.</li> </ul>	<p>landlord entity would not be a federal laboratory let alone a Federally-Funded Research and Development Center (FFRDC). What happens at the site would be entirely up to the new authority and its funders and stakeholders – including, not least, the local community. Decisions about the site and the new institution should be entirely disconnected from decisions about the future of LLNL and SNL/CA, except as regards infrastructure and the geography of the site. It might make sense for this site to become a regional science and technology center of some kind, but then again it might not.</p> <ul style="list-style-type: none"> <li>▪ The plutonium pit environmental testing function at LLNL should be transferred to Pantex as discussed in the 2008 Record of Decision for the Complex Transformation Supplemental Programmatic Environmental Impact Statement.<sup>6</sup> It is not practical to create a temporarily-higher security category.</li> <li>▪ End wasteful parallelism in supercomputing by consolidating supercomputing at one site, preferably LANL under this scenario. I recognize LLNL’s historic strength in this field as well as its better geographic location and would bow to convincing argument, about keeping a program at LLNL. NNSA needs to cut its ASC budget, however. See Scenario 2.</li> <li>▪ The absorption of SNL/CA’s functions into LLNL would provide, for the first time, institutionally-independent peer review for SNL’s engineering work as well as for SNL’s staffing and cost estimates.</li> </ul>
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<sup>6</sup> [DOE/EIS-0236, Record of Decision for the Complex Transformation Supplemental Programmatic Environmental Impact Statement--Tritium Research and Development, Flight Test Operations, and Major Environmental Test Facilities, 73 FR 77656 \(December 2008\)](#), pp. 7-8 in excerpt posted.



<ul style="list-style-type: none"> <li>▪ With parallel planning for LLNL, slow, review, and likely cancel further acquisition of supercomputing platforms, past the current “Cielo” machine at LANL. The ASC program’s aspiration for full nuclear explosive prediction software is unnecessary for indefinite stockpile maintenance.</li> <li>▪ Be sure all WFO fully pays its way. This may recover some cash for remaining DOE programs.</li> <li>▪ Initiate an aggressive campaign to construct, using locally-owned businesses, renewable energy sources supplying a large percent of needed electrical power at LANL, with storage as needed, at or adjacent to LANL.</li> <li>▪ Right now, DOE should put its foot down and prevent future public access to any proposed “Manhattan Project National Historical Park” (MPNHP) facilities at LANL, should Congress be so misguided as to create a MPNHP.</li> <li>▪ LANL should look again at cleanup and disposition of unneeded peripheral lands, which also may be suitable for power generation and storage as noted above.</li> <li>▪ The Weapons Engineering Tritium Facility (WETF) is deeply troubled and located almost directly over the largest seismic fault at LANL. It has been closed for 4 years with a series of safety problems. The building is aging. Realistically, it may never reopen and perhaps it shouldn’t. Would the larger, newer, less seismically impacted SRS facility suffice?</li> </ul>	
<p><b>Scenario Two: cut LANL more than LLNL, leaving LANL as a “peer review” and user facility lab plus production (detonators and plutonium pits); combine LLNL and SNL/CA; keep production under LANL management</b></p>	
<p><b>“LANL 2”</b></p>	<p><b>“(LLNL + SNL/CA) 2”</b></p>
<ul style="list-style-type: none"> <li>▪ This scenario is similar to the above except that it is LANL which loses the primary responsibility for warhead stewardship. LANL remains a site for non-duplicative user facilities like DARHT, in parallel to the</li> </ul>	<ul style="list-style-type: none"> <li>▪ LLNL would shrink some, but not as much as in Scenario 1.</li> </ul>

<p>National Nuclear Security Site (NNSS) in Nevada.</p> <ul style="list-style-type: none"> <li>▪ The primary reasons for this scenario have to do with inherent geographic advantages of LLNL, in a) computing, b) personnel recruitment and training, and c) embeddedness in a vibrant intellectual and technical culture. The key assumption is that weapons design can be successfully split geographically from SC 1 and 2 special nuclear materials as well as from most high explosives work. It is also assumed that key LANL personnel (e.g. for the W76, W88, B61, and W78) would move to LLNL.</li> <li>▪ Alternatively LANL might retain lead responsibility for one warhead, for example the W76.</li> <li>▪ LANL production capabilities would continue.</li> </ul>	
<p align="center"><b>Scenario Three: cut LLNL and LANL in a balanced manner as appropriate given a) large-scale program cuts and b) anticipated stockpile changes; combine LLNL and SNL/CA; keep production under LANL management</b></p>	
<p align="center"><b>“LANL 3”</b></p>	<p align="center"><b>“(LLNL + SNL/CA) 3”</b></p>
<ul style="list-style-type: none"> <li>▪ This is the conservative choice. It assumes, I believe correctly, that security and other fixed overhead costs are not much different between this and the previous two options.</li> <li>▪ Close LANSCE and its related missions.</li> <li>▪ Close and D&amp;D CMR soon and make other changes as in LANL 1.</li> <li>▪ Do not build plutonium modules.</li> <li>▪ See the above “LANL 1” reforms.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Begin retiring and transitioning B83 personnel</li> <li>▪ Take NIF off the DOE books, quite likely ending its operation.</li> <li>▪ Close Site 300.</li> <li>▪ See above reforms.</li> </ul>
<p align="center"><b>Variation A: Do not combine LLNL and SNL/CA</b></p> <p align="center">I don’t think this is quite as attractive as combining these two labs but it is conservative.</p>	
<p align="center"><b>Variation B: LLNL and LANL as above but split production out of the LANL contract</b></p> <p align="center">The question is whether SC 1 and 2 SNM can be split off from other nuclear weapons work.</p>	
<p align="center"><b>Variation C: LLNL and LANL as above but split cleanup out of the LANL contract</b></p> <p align="center"><i>As of today, September 26, 2014, DOE has apparently made a decision to do just this.</i></p>	
<p align="center"><b>Reforms applicable to both laboratories, as well as in some cases to other labs</b></p>	

- Remove both laboratories from FFRDC status. These labs should have targeted, accountable missions.
- M&O laboratory contractors should not be managing construction projects, a big issue at LANL. They should be focusing on program, not construction (avoiding a “skills and focus conflict”). Further, M&Os should not manage any projects for which they inevitably play a large part in initiating and promoting (avoiding “conflict of interest #1”), especially when they can skim a large fraction of the appropriated funds as overhead (avoid “conflict of interest #2”), which they can now do all too often.
- *All* DOE laboratories should aggressively seek to replace most external electrical power with power generated on site by sun and wind, and also aggressively seek *and apply* storage and load balancing technologies to demonstrate technologies, create markets, and foster private-sector innovation and investment. The big DOE laboratories are huge energy sinks and greenhouse gas sources – how can this be tolerated?
- We should realize that much of the original Science Based Stockpile Stewardship (SBSS) program was not necessary, or else – which comes to the same thing at this point – is now mature and can be scaled back, in some cases dramatically.
- The U1a facility at the Nevada National Security Site (NNSS) with its new diagnostics (Cygnus) has made the Confined Firing Facility (CFF) at Site 300 fully obsolete and has made DARHT at LANL largely obsolete. CFF should never have been built and should be closed, along with the rest of Site 300. DARHT should be carefully reevaluated for closure, mothballing, or placing on a reduced operational tempo.
- In our view there is no marginal national security value in designing new nuclear explosive packages (NEPs). The work of the physics laboratories should be confined to the stewardship of existing designs without attempting to design, test, and certify new ones. Different nuclear explosives have no marginal deterrence benefit. That is, if there ever is a so-called “interoperable warhead” (IW) or Long-Range Stand Off (LRSO) warhead, neither of which we believe is advisable, they should be closely based on, or actually be, existing warhead types.
- While it is not necessary for these laboratory reforms, it would save quite a bit of money and improve management to dissolve NNSA back into DOE, as suggested by the DOE Inspector General (IG) in 2011.
- SNL should become the default “go-to” national security laboratory of the three in the absence of other considerations. To some degree it is already that. The two physics laboratories should not pursue new national security missions outside their relatively narrow specialties. Even in the absence of accurate public data we know, from cloistered briefings, that the NNSA laboratories have costs that are higher than GOGO labs, for example those operated by the military, or GOCO labs operated by university-affiliated nonprofits.
- Do not use NNSA laboratories for the “national competitiveness” or “industrial innovation” mission. This mission, to the extent it makes sense at all (it doesn’t), does not make sense at these NNSA laboratories. This was one of the clear findings of the 1995 Galvin Panel and was based on considerable experience up to that time. In almost every case, such missions belong outside the DOE, for example in university-based centers, many of which will have significant regional specialization and better participation from public and private institutions. The DOE laboratories dry up funds that should go to universities and stultify science by emphasizing vested DOE

interests. Without reading the [latest Brookings piece](#) on this topic, it bears repeating that the mission of the nuclear weapons laboratories is not, and should never be, “technology transfer.”<sup>7</sup> The nuclear weapons identity, culture, history, and management constraints are powerful and mold laboratories unsuited to civilian missions, especially if nuclear materials are involved in any quantity.

- Cleanup and D&D is a significant mission at NNSA laboratories, particularly LANL, but must be evaluated separately on its merits in each case and not used to “compensate” the labs for declining programs. It does not enter into this sketch further, except to note that DOE announced today (9/26/14) that cleanup would no longer be a NNSA responsibility. Cleanup and D&D will grow in importance at LLNL under this scenario as the site shrinks and enters new management, which cannot be expected to begin life with assumed environmental mortgage.
- I am sure the other 14 laboratories have ample space for consolidation and closure but cannot comment on them in any depth except to point out that DOE has flagrantly failed in its primary energy mission and continues to deliver poor value when evaluated by that metric. Many of these labs are devoted to pursuing science for its own sake, with budgets upheld by local pork-barrel politicians. No doubt some of these sites should be mothballed to pay for climate-saving and energy transition initiatives. Staff at these sites should be offered early retirement or subsidized in their transition to work in important applied programs. I am saying that DOE invests too much in

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<sup>7</sup> You must be aware of the anonymous paper, “[Broken Promises: The White House, Special Interests, and New START](#)” which chronicles and critiques the attempt of the NNSA labs to gain broader missions in the context of domestic New START negotiation.

I cannot improve upon the comments, quoted with permission, of Manuel Garcia, former LLNL physicist, from a few years ago:

The "brilliant minds" and "use[less] infrastructure" [quoting another author, with whom Garcia is disagreeing] of the nuclear labs are incapable of "work the world needs." That these nuclear weapons playpens might be "useful" to civilian purposes is a great misconception widespread among the public. Certainly, some of the individuals in these labs could apply themselves to "useful" work, applying technical skill to improve social conditions, if they were placed in the right setting (and in rare cases, on their own as lone scientist-inventors). But, such people are the exception. The vast majority are unable to conceptualize actual social needs, and few have technical expertise that is applicable to "real world" problems. Most of these "brilliant minds" need massive high-tech resources to work on arcane details of exotic physical situations with no relation to the experiences and problems that face most of humanity. Also, most of these "brilliant minds" expect lots of money for their work, and would not be cost effective to projects aimed at improving social conditions. Just like an old battleship is useless for passenger or cargo or fishing or ocean research purposes, the nuclear weapons people are similarly useless outside their niche. The only way to make the battleship useful for peaceful ends is break it up for scrap metal. Similarly, the only way to get "usefulness" out of nuclear weapons experts is to put them into civilian occupations at an entry level, and let them start over in a new "peace" mode. Few will show themselves to be brilliant.

The waste of the labs is that they suck up national resources (money and graduates of technical schools) that would be better spent on projects for the solution of real social problems (e.g., clean water worldwide, renewable energy, public health, care of the environment, etc.) and the education of new young experts to man these projects. Just as the Iraq and Afghanistan wars suck money out of the federal budget and impoverish our society (lack of funding at state and local level for social programs), so do the nuclear labs act like little fiscal black holes of war, that suck up what could otherwise be useful investment in technical education and socially beneficial research. The labs cannot be reprogrammed, only melted down and recycled.

theory and not enough in its energy mandate.

- DOE contractors, especially the NNSA laboratories, have too much political power and have inherent conflicts of interest. This is addressed further below.
- Lab contractors should be distinct from one another (contra the case at LANL and LLNL today) and should not be site-specific companies, i.e. they should have “reach-back” to the parent companies.
- M&O lab managers should not be M&O officers.
- The subcontracting situation at LANL at least is broken, as the shipment of reactive waste to WIPP demonstrates. In general, functions which are intrinsic to laboratory operation and require significant skill, training, and tacit knowledge, such as nuclear waste management, should not be subcontracted. Subcontracting subdivides responsibilities, impedes investment in training, encourages transience, undermines supervision, and creates accountability problems. It may have benefits but they must be more carefully assessed. As noted, DOE has taken action to address this problem as it relates to legacy waste at LANL.
- Very large, diverse labs cannot be easily managed, particularly if there is also geographic balkanization on the site as at LANL. LANL cannot be managed well at its present scale, degree of geographic dispersal, with its present high hazards, and with its diversity of programs and disciplines. LANL should be focused.
- Labs located far from large cities and their diverse intellectual life and institutions (e.g. LANL) will acquire site-specific groupthink just as I. I. Rabi warned in 1943 as well as repressive personnel practices, given that employees who have become personally vested in the community have nowhere else to go. LANL cannot always be relied upon for objective views or perspective on important national security problems. LANL’s future size and diversity should not be decided with that hope in mind. LANL cannot even choose kitty litter well.
- There are a number of immediate contract improvements which could be negotiated with the corporations involved in the context of a determined executive branch. Upon information and belief, DOE’s lab contracts are almost uniquely weak in government. They do not use the standard Federal Acquisition Regulations (FAR) but rather DOE’s own special DOE Acquisition Regulations (DEAR). What will LANS pay for shutting down the WIPP site? In truth, nothing less than loss of the contract altogether is warranted.
- Tremendous economies and other benefits would accrue from federalizing the labs. During the Manhattan Project LANL was approximately 50% federalized (this could be pinned down better and it changed over time); the University of California employed the other half. The Hatch Act applies to federal employees, obviously, so labs would be considerably depoliticized. Alternatively, selected functions within and across NNSA labs and sites could be federalized (e.g. security), creating an experience federal corps. Alternatively, or in addition to federalizing selected functions, senior lab management could be federalized, eliminating a great deal of corporate overhead and also eliminating the NNSA field offices. Nuclear weapons are an inherently federal function. It is outrageous for a private contractor to be reporting to the President of the United States on the subject of nuclear weapons policy – so outrageous as to be not quite credible to even senior senators and executive officials, who have at times expressed confusion on this point.
- The pension fund “tax” on NNSA could be lowered or eliminated by “taxing” current employees more progressively.

- Lab management fees: slash or eliminate them, going toward a "public service model" as noted above.
- Lab management salaries should be capped at Senior Executive Service (SES) levels. These are public service jobs. Non-salary benefits (e.g. car and travel allowances) should be eliminated. This is a lesser reform, obviously, than federalization.
- Even with the present M&O structure, specific categories of lab overhead could be eliminated or capped at lower levels, e.g. public relations (while prioritizing transparency), and change-of-station assignments in Washington, DC.

The missions of Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL) are thin – there is, in these two labs, too much lab and too much money chasing too little mission. This, I suggest, is the biggest problem at these two places and is prior to and more fundamental than any other reform.

The entrepreneurial character of these laboratories has led to repeated bad outcomes – to billions of dollars in wasted programs and failed projects, for starters. The objectivity and integrity behind some of the big science and big nuclear projects is appallingly low, and that lack of objectivity is a very strong, pervasive institutional feature. It has been that way for a long time. National security authorities will not get straight, objective answers from these labs to questions that bear in any way on their corporate interests or their parent companies' corporate interests, which are extensive.

The answer to the question of how the two physics labs, at least, can contribute science and technology "in today's threat environment" (not a phrase I would use but one often heard in Washington) is just not as broad as their corporate directors would assert. Their strengths are unique but they are best as focused, smaller, facilities.

Retaining tacit knowledge in nuclear weapons – even in what kitty litter to use to absorb free nitric acid in a matrix of nitrate salts – will not be possible in the face of demographic and wider historical changes unless these labs are more focused and smaller. We have seen time and again that LANL, for one, cannot access or use its own institutional store of knowledge. Unique expertise can be diluted and functionally destroyed by corporate bureaucracy.

Sandia National Laboratories (SNL) is fundamentally different than the two physics labs and an easier management challenge. There are three main reasons for this. First, everything SNL designs can be and is thoroughly tested. Second, the technologies with which it concerns itself have counterparts in the civilian engineering world. Third, nuclear weapons comprise only about half SNL's mission, and the nature of the nuclear weapons work is not so nuclear – it often has broader applications, and it involves little or no nuclear material. For these three reasons (no doubt among others), it is easier to be practical and realistic at SNL than at LANL and LLNL, *ceteris paribus*. SNL does science, but the laboratory has a more practical, engineering character. But SNL still exhibits appalling scientific and engineering judgment when its long-term interests are involved. For example, SNL leadership threw their weight behind "the hydrogen economy" when a few hours' work would have shown that such a thing was not practical.

These conclude my comments at this time. Thank you for considering them.

Sincerely,

Greg Mello