

Background on the Quality of Nuclear Weapons Programs at LANL

The security and fiscal mismanagement scandals at the Los Alamos National Laboratory (LANL), managed by the University of California (UC), are well known. For its institutional survival the Lab is relying upon what it purports to be the excellence of its science. As the Lab's FY03 Institutional Plan (the latest available) puts it "LANL's core mission is nuclear stockpile stewardship" and "[b]asic, cutting edge science is the foundation on which all programmatic endeavors at LANL are built." Seventy-nine percent of the DOE's requested Fiscal Year (FY) 2005 funding for LANL is for its core nuclear weapons programs. In combination, "Science" at the lab is largely synonymous with its nuclear weapons programs. How well then did UC manage LANL's nuclear weapons programs, even before the current stand down in operations costing the American taxpayer some \$6 million per day?

The "FY 2003 Annual Performance Appraisal of Management the University of California's and Operation of Los Alamos National Laboratory" provides a great deal of insight. This appraisal, dated December 19, 2003, was conducted by the National Nuclear Security Administration (NNSA), the semi-autonomous nuclear weapons agency within the Department of Energy, as part of the UC fee determination. It has only recently available at <http://www.doeal.gov/lanlcontractrecompete/Appraisal.htm> (90 pages, 1MB). Thirteen pages of excerpts are also available at <http://www.nukewatch.org/facts/nwd/NNSAEx081104.pdf>. Appraisal quotes used here are in italics, preceded by the appraisal's page number. This background paper also draws upon congressional and Defense Nuclear Facilities Safety Board reports and audits by the DOE Office of Inspector General.

11. NNSA/HQ NA-122 believes LANL needs to demonstrate a greater commitment to the enduring weapons stockpile. The reference to NNSA/HQ NA-122 is significant given that it is the NNSA headquarters Office of Nuclear Weapons Stockpile under the Asst. Deputy Administrator for Military Application and Stockpile Operations. Unfortunately, the NNSA appraisal does not really provide background or justification for that statement.

However, the House Appropriations Committee certainly provided strong congressional background related to that statement. While rejecting requested FY05 funding for the "fourth generation" of US nuclear weapons (Advanced Concepts and the Robust Nuclear Earth Penetrator (RNEP)) it reported at length:

The Committee continues to oppose the diversion of resources and intellectual capital away from the most serious issues that confront the management of the nation's nuclear deterrent... the Committee remains unconvinced by the Department's superficial assurances that the RNEP activity is only a study and that advanced concepts is only a skills exercise for weapons designers. The Committee notes that the management direction for fiscal year 2004 sent to the directors of the weapons design laboratories left little doubt that the objective of the program was to advance the most extreme new nuclear weapon goals irrespective of any reservations expressed by Congress... The Committee recognizes the dilemma the NNSA's nuclear weapon design laboratories find themselves in after the Cold War... the importance of nuclear weapons to the war fighters in the Pentagon has steadily diminished. The pressure on the nuclear weapon design laboratories to maintain the canonical role for their weapons in order to justify increasing budgets becomes very difficult. By contrast, the Committee's pri-

orities are maintaining our Nation's nuclear deterrent in a safe and secure condition and maintaining our Nation's integrity in the international effort to halt the proliferation of weapons of mass destruction. The Department's obsession with launching a new round of nuclear weapons development runs counter to those priorities. The Committee directs the NNSA to focus wholly on its primary mission of maintaining the safety, security, and viability of the existing stockpile by executing the Stockpile Life Extension Program and Science-based Stewardship activities on time and within budget. *House Appropriations Committee Report 108-554 (pdf) on Fiscal Year 2005 Energy & Water Development Appropriations bill, H.R. 4614*

How did LANL do in the past in meeting that primary mission of maintaining the safety, security, and viability of the existing stockpile? For the "Mission" portion of the LANL management contract the NNSA gave UC an "excellent" rating seemingly unjustified given the following specific deficiencies noted by the appraisal (grouped here by broad subject matter, with any comments or clarifications in plain type):

Stockpile Life Extension Program and Science-based Stewardship Activities

- *1. NNSA program managers indicated that they have not been provided information on the primary metrics for the W88 or the W76. As the self-assessment notes, progress in developing metrics for secondary certification has been very slow.* Primaries are the plutonium pits plus surrounding high explosives that together act as the "triggers" for the U.S.'s modern thermonuclear weapons. Secondaries are the thermonuclear stage that undergoes fusion after the primary fissions in a thermonuclear weapon. The W88 and the W76 are the two warheads deployed on American Trident submarines and their importance to the U.S. nuclear arsenal cannot be overstated.
- *3. Specifically, the decisions to scale back from four to two major ASCII codes and to emphasize two-dimensional codes for the near term will facilitate the immediate stewardship needs...*

ASCII, the Advanced Strategic Computing Initiative, "was established in 1995 to help DOE Defense Programs [now the NNSA] shift from test-based confidence to simulation-based confidence in certifying the functionality of nuclear weapons, based on advanced weapon codes and high-performance computing" (NNSA ASCII website). Hence, its success is central to the professed aim of ensuring stockpile safety and reliability in the absence of full-scale nuclear weapons testing.

Between FY03, FY04 and the request for FY05 \$2.14 billion will be spent on ASCII throughout the NNSA's nuclear weapons complex (and perhaps at least another \$2 billion beginning in 1995). The scaling down at LANL (and apparently Livermore as well) from 4 weapons codes to 2 and from 3-d to 2-d is significant and may indicate deep problems for laboratory performance and for the future of the Stockpile Stewardship Program as a whole.

- *7: The inadequate efforts of the laboratory to communicate with NNSA program management is a long-standing issue.*
- *11: Significant issues exist regarding LANL's support of LEPs [Life Extension Programs]. NNSA has been waiting since April 2003 for a laboratory integrated DSW program [the Directed Stockpile Work program], and, four separate hydro tests planned for the W76 LEP were rescheduled from FY03 to later years.*

- 12: *Reconciliation of the basis for certification with known issues continues to temper the overall conclusions reached in addressing the need to return to underground nuclear testing.*
- 15: *Four separate hydro tests planned for the W76 LEP were rescheduled from FY03 to later years. Missed milestones included Hydro Test Schedule/Plan; four separate hydro tests planned for the W76 LEP were rescheduled from FY03 to later years. Hydrotests remain a concern.*
- 16: *LANL is the second largest production agency in the nuclear weapons complex—it is responsible for the manufacture of detonators, mock pits, beryllium inserts, packaging and transportation containers, and neutron-tube target loading (not a directive schedule item). With only six production plants left in the nuclear weapons complex, LANL has assumed responsibility for the missions of several plants that were closed at the end of the Cold War. LANL as a major nuclear weapons production center is often overlooked and belies the Lab's conscious projection of itself as a scientific campus under University of California management.*

LANL and other DOE facilities have a serious backlog in enhanced surveillance tests. As the DOE Inspector General put it "Surveillance testing, a key component of the Stockpile Stewardship Program, has been characterized as the first line of defense for maintaining high confidence in the stockpile and is the linchpin between stewardship activities and the annual certification process" (Stockpile Surveillance Testing, DOE IG-0528, Oct. 2001). At that time the DOE IG concluded that "immediate and aggressive action should be taken to ensure the continued viability and credibility of the Stockpile Stewardship Program."

Recently, the DOE IG observed

... Los Alamos and Lawrence Livermore National Laboratories and the Pantex Plant had not completed critical work as scheduled in four of the six major technical elements: pits, canned sub-assemblies [secondaries], high explosives, and non-nuclear materials. The delays, some for as long as 23 months, were due primarily to weaknesses in project planning. For example, Los Alamos, Livermore, and Pantex had not adequately planned for unexpected events that arose such as: safety basis documents which required updating and other improvements; essential facilities which were found to be unavailable when needed; critical equipment failure, and a lack of necessary weapons parts... [F]ailure to complete critical enhanced surveillance milestones as scheduled could delay warnings of manufacturing and aging defects, impact the annual certification of the nuclear stockpile and hinder facility planning decisions. The viability of the nuclear weapons stockpile depends upon timely notification of problems so the weapons components can be replaced or systems refurbished before safety, reliability, or performance are adversely affected. *"The NNSA's Enhanced Surveillance Campaign," DOE/IG-0646, April 2004.*

Plutonium Pit Production

- 11: *...but the [sic] pit manufacturing and certification project has had some serious problems integrating activities of the production and design agency. Requirements for the qualification of non-nuclear pit components were not resolved between the two groups in a timely fashion and continues to delay the development of a workable schedule to conduct engineering certification experiments, with the project yet unable to generate an integrated schedule. To date \$1.27 billion has been spent on LANL's pit manufacturing and certification campaign. This does not include all directly relevant costs, such as the operating costs for the lab's plutonium facilities (around*

\$90 million per year).

As stated in the DOE's 2000 Congressional Budget Request "...the current objective is to establish a long-term capacity for manufacturing up to 50 pits/year with a single shift of personnel... In the nearer term, we will achieve an annual capacity of 20 pits by 2007, with the goal of having a war reserve W88 pit available for the stockpile in 2001."

LANL has repeatedly found itself incapable of meeting these goals. The FY05 Congressional Budget Request now states "An interim pit manufacturing capability of 10-20 pits per year is currently being re-established at Los Alamos National Laboratory (LANL), but this capability will not be sufficient to support the long-term requirements of the nuclear weapons deterrent."

This refers to the NNSA's plans to build and operate separately from LANL's existing pit production infrastructure a Modern Pit Facility, capable of up to 450 pits per year (with construction costs up to \$4.1 billion). The NNSA claims the MPF is needed for future "capacity" requirements (i.e., a Cold War-size arsenal) and the "flexibility" to produce new designs. Both of these assertions run counter to the policy direction given by the House Appropriations Committee, which saw fit to zero out MPF funding for FY05.

During FY03 much was made of the Lab's production of a "certifiable" pit, which is not the same as a certified war reserve pit that could be deployed to the stockpile. The NNSA assessment describes it as "The manufacturing of Certifiable pit (Qual 1) was an achievement of global significance." Now LANL's goal for a manufactured war reserve pit is 2007, a six-year delay from the original goal, by which time it will have cost around \$1.7 billion. Yet these long delays and rising costs never seem to impact the NNSA assessment of UC performance at LANL.

Nuclear Weapons Facilities

- *30: General Plant Projects. ... Approximately one third of the projects performed in the unsatisfactory and marginal rating area. These projects were troubled with project management issues ranging from lack of readiness of owning divisions to execute, sluggish organizational abilities to pull together the integrated project teams, and verification of environmental, safety, and health documents with project design and construction documents.*
- *38: Lack of integration plagued several projects this year with LANL Weapons Engineering Directorate having to place a facility in standby mode. Other passages suggest that this is LANL's Weapons Engineering Tritium Facility (WETF), the new locus of consolidated tritium activities at the lab. Tritium, a radioactive isotope of hydrogen, is critical to the U.S. nuclear weapons stockpile as it is used to "boost" weapons to their designed yields. The Defense Nuclear Facilities Safety Board (DNSFB) reports that WETF, built some 8 years ago, "is expected to be fully functional by November 2004."*
- Radiography Facility at TA-8: A May 27, 2004 report from the Defense Nuclear Facilities Safety Board (DNSFB) states "In April 2004, NNSA suspended radiography of tritium and explosive items because of identified lighting protection deficiencies. Subsequently, LANL suspended operations because the fire alarm system does not comply with code requirements."
- The same DNFSB report states that "the annual update requirements for safety bases are not being enforced." This includes the plutonium pit production facility, which has not had a renewed safety basis in

7 years (they are legally required). The Lab's largest nuclear facility, the Chemical and Metallurgical Research Building, has not had one in 5 years. In all, "LANL currently has 26 nuclear facilities, include 17 that are HC-2 (the 2nd highest level) and that have a number of safety bases issues."

- 44: ... no real improvement has been seen in implementation of quality Authorization Basis Documents, in TSR [Technical Safety Requirements for operating nuclear facilities] compliance or proactive implementation of new Authorization Basis Documents. LANL's implementation of this program and activity is considered unsatisfactory...

The Dual Axes Radiographic Hydrodynamic Testing Facility (DARHT)

DARHT is a nuclear weapons facility in a class unto itself. What the facility's name implies is that it has two lines of sight that radiograph (x-ray) imploding surrogate pits. These pits don't achieve criticality either because they are made of a non-fissile isotope of plutonium/highly enriched uranium and/or lack sufficient fissile material for criticality. Under the achieved intense pressures and temperatures dense metals behave like a liquid, hence the word "hydrotest."

LANL sought to begin construction of DARHT in 1996, when two citizen organizations brought suit against DOE for its lack of a legally required environmental impact statement (this writer was involved in that suit). During the initial argument and subsequent 16-month injunction against construction until an EIS was completed very high ranking federal officials (such as the Secretaries of Energy and Defense) repeatedly attested that DARHT was absolutely essential to the Stockpile Stewardship Program and the nation's nuclear deterrent. As additional background, LANL has plans for a follow-on Advanced Hydrotest facility, costing up to \$2 billion.

The DOE Inspector General reports:

Original plans [in 1988] called for the development of two single-pulse axes with similar capabilities at a cost of \$30 million [\$47.45 million in 2004 dollars]. In 1998, the scope was changed to expand the capability of the second axis while at the same time increasing the cost to \$270 million... In addition, scope changes - which reduced or eliminated work elements and transferred critical activities to other projects - have been made, giving the appearance that the total cost is within the planned budget... These shifts in critical work elements results in a total of at least \$57.5 million in non-project fund spending [above the \$270 million]... We recommend that that the Administrator, NNSA: 1. Require Los Alamos to adjust the DARHT baseline to accurately reflect the total cost of bringing DARHT to full operations capability. *"The Dual Axes Radiographic Hydrodynamic Testing Facility," DOE/IG-0599, May 2003.*

The NNSA FY03 assessment reports:

- vii: In this fiscal year, there was insufficient LANL management attention to infrastructure needs to support and execute a national plan [for hydrotesting] and the full utilization of DARHT [the Dual Axes Radiographic Hydrodynamic Testing Facility] was not adequate... LANL's integrated program baseline, initially projected for completion by July 2003, is still being developed.

- 6: ... requirements for conducting tests at DARHT have become more difficult and complex.
- 26: Technical limitations in the second axis system [of DARHT] can be traced to difficulties in project management and design R&D. It is unclear where the design problems stem from since this is a multi-lab effort.
- 29: Planning for full utilization of DARHT has been inadequate....
- 35: DARHT - Marginal [for management as a line item project]
- 41: NNSA has significant concerns about LANL's performance for phase II of the DARHT including: a) significantly underestimating the requirements for fully commissioning the Phase II accelerator; b) failure to recognize and correct incorrect voltage testing of accelerator cells, and c) failure to notify NNSA of the incorrect voltage until after the full project and accelerator system had been accepted by NA10 (CD4 approval)... This information was not conveyed to NNSA, prior to the approval of CD-4d in March 03. In light of all of the above the Lab's omission seems particularly egregious.

Operational Safety

- 43: LANL has not met expectations and requires improvement in areas of Lightning Protection, Lockout/Tagout, Fire Protection, and Medical Monitoring. The Explosives Safety Program has also experienced a number of setbacks in FY03... Lockout/Tagout continued to be a concern at the laboratory, with many incidents reported by Facility Representatives... The NNSA Site Office Director placed LANL on notice that within 30 days they would either effect significant corrective action [on Integrated Safety Management] or shut down operations. The Work Control record and implementation of Safe Work Practices did not demonstrate management commitment to safety.
- 44: Unfortunately, PAAA [Price Anderson Act Amendment activities on nuclear safety] implementation at LANL is lagging behind program improvements. LANL received an Notice Of Violation (NOV) on April 10th, 2003 for non-compliance with radiological controls, work control, safety basis issues, and quality improvements which documented ineffective institutional corrective actions dating back to 1996. On July 7, 2003, LANL received an Enforcement letter for noncompliance with radiological controls, work control, and safety basis issues for nuclear safety issues that demonstrated a negative trend. These actions were a continuation of a pattern of operational problems related to PAAA...
- 45: During the evaluation period, LANL committed 45 violations of Technical Safety Requirements (TSRs) for its operating nuclear facilities (nearly a four fold increase over previous average violations per year). Per the CFR, the TSRs are the major controls for nuclear safety in a nuclear facility to ensure that the residual nuclear risks to workers, the public, and the environment are acceptable. Systemic and systematic violations of the TSRs are not acceptable from a nuclear safety perspective. Additionally, LANL committed 18 safety basis violations. The numerous violations indicate that LANL has not been complying with operations of its nuclear facilities in accordance with approved DSAs and TSRs as specified in 10 CFR 830, Subpart B.
- 50: FWO-Fire has not followed through to close findings identified in their Fire Hazard Analysis (FHA). Some findings are over a year old and the facilities do not seem to be interested in closing the finding. The code required maintenance of fire systems is being accomplished at approximately 60 per cent level... Explosives Safety is less than satisfactory... Preventive Maintenance vital to system safety has been foregone due to programmatic pressures...

Conclusion: With this evidence it seems clear that deep and systemic problems pervade LANL's nuclear weapons programs. While its fiscal and security scandals are well known, to date there has been little public acknowledgement of the Lab's deficiencies in its "Science," "Mission" and operations of nuclear facilities. These deficiencies should be carefully weighed in any decision to continue University of California management of LANL. More profoundly, these deficiencies could also have adverse consequences to our nation's national security, such as prompting the U.S. toward a decision to return to full-scale nuclear weapons testing, which other countries would likely follow. Finally, there is always the question of the proper and efficient use of taxpayers' money, a test we believe LANL's fails.

Questions, clarifications, more information? Contact:
Jay Coghlan at 505.989.7342 or <jay@nukewatch.org>

August 2004