

## Introduction

Since the Manhattan project was initiated during WWII to build the United States' first nuclear weapons, our University has overseen the nation's two large nuclear weapons research facilities at Livermore and Los Alamos. Indeed, every nuclear weapon in the US arsenal—which now numbers around 10,000 warheads<sup>1</sup>—was designed by a University of California employee. UC Santa Barbara physicist and Nobel Laureate Walter Kohn has indicated that the “UC has been responsible for the R & D on the nuclear components of every single type of nuclear weapon existing in the world today.”<sup>2</sup> Most UC students are unaware of the connections between our University and the military, and of the UC's seminal role in the development and production of nuclear weapons of mass destruction.

To address this problem, the Coalition to Demilitarize the UC has created this student-facilitated course to examine and discuss numerous intricate, interesting, and controversial issues around our University's relationship to the nuclear weapons labs, and to the military-industrial complex more broadly. In this course, we'll survey the history of nuclear weapons, and examine some case studies of popular resistance to nuclear weapons production and testing through the Cold War up to today. We will examine the interlocking framework that binds the UC to the military-industrial complex, taking our University's “managerial” role of the nuclear weapons labs as a case study. We'll take a critical look at the UC Regents as the University's decision-making body and principle overseers of the relationship between the University and the weapons labs. We'll situate our discussion of the military-industrial-academic complex in the broader context of contemporary global capitalist economies and aggressive US foreign policy. We will focus on the roles of scientists and engineers in serving the interests of power through the development and stockpiling of nuclear arsenals. We'll study the ethics and politics of nuclear

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<sup>1</sup> According to the Center for Defense Information (<http://www.cdi.org/>), “In spring 2004, the US stockpile contained approximately 7,000 operational nuclear warheads, including 5,886 strategic and 1,120 non-strategic warheads. Some 3,000 additional warheads are held in reserve, with a few hundred, under current plans, slated for dismantlement. Current plans call for the US to reduce its strategic nuclear arsenals to 1,700 – 2,200 operationally deployed warheads by 2012. The majority of the weapons removed from the arsenal, however, are moved to either a responsive or inactive capacity, rather than dismantled. In addition, the US has a sizable tactical nuclear weapons arsenal.”

<sup>2</sup> Kohn, Walter. *UC Should Discontinue Management of Weapons Research, Development and Production at Los Alamos*. Presentation to the UC Regents Committee on Oversight of the DOE Laboratories, July 15, 2004.

weapons science, and investigate the mechanisms through which dominant paradigms are reproduced in our educational and research institutions. We'll also survey the ecological and public health effects of nuclear weapons science, development and production, and examine case studies in environmental justice relating to nuclear issues.

What do we hope to accomplish with this? One, we seek to raise UC students' consciousness of the connections between our University and the military, and specifically nuclear weaponry. We're hoping to provide you with information you may not receive in your standard curricula at the University.

Two, the UC has held the management contracts for the weapons labs since their inception; however, former Secretary of Energy Spencer Abraham announced last year that the Department of Energy—the government agency that funds and directs work at the labs—would put the labs' contracts up for bid. This means the UC may no longer monopolize a direct connection to the labs. The UC may engage in some kind of corporate partnership with industry to manage the labs; or the labs may be turned over completely to another university or to a corporation such as Bechtel or Halliburton.

(Or, although it is a bit of a longshot, the DOE may award the contract to a recently formed coalition of peace groups and nuclear watchdog organizations including Nuclear Watch of New Mexico, Tri-Valley CAREs of Livermore and the Coalition to Demilitarize the UC. Last Thursday, January 20, this consortium announced its intention to submit a bid for the LANL contract at a press conference at the UC Regents' meeting in San Francisco.<sup>3</sup> So, pay attention in this class—you may shortly be called upon to help manage a national laboratory if the LANL contract is awarded to this consortium of students and community activists.)

At any rate, since the nature of the relationship between our University and the nuclear weapons labs affects everyone in the UC community, we feel that initiative needs to be taken so that UC students can be informed of the potential changes taking place, so that a higher degree of participation may be possible by the student body in University decisions.

Lastly, as per the 2002 National Security Strategy and Nuclear Posture Review under the recently reinstated Bush administration, the US has been and will continue to develop and implement new varieties of nuclear

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<sup>3</sup> Iqbal, Adeel. *Nonprofits Will Enter a Bid for Los Alamos Lab: Groups Seek Greater Transparency, More Civilian Science*. Daily Cal. <http://www.dailycal.org/article.php?id=17314>

weapons, including ground-penetrating devices as well as smaller, “more useable” nuclear weapons, and to refurbish and modify existing designs. Plans are also underway to construct a Modern Pit Facility to enable large-scale production of the plutonium cores of nuclear weapons. Indeed, LANL has already begun to supervise the manufacture of new plutonium pits.<sup>4</sup> This activity is illegal under international law, including Article VI of the Nuclear Non-Proliferation treaty, and puts the population of the US as well as the rest of the world at greater risk through increased nuclear proliferation. Nuclear weapons science and the manufacturing of nuclear weaponry poses serious risks to ecosystems and public health, including science workers as well as communities around the laboratories, manufacturing facilities, and testing sites. Our coalition is working to increase public consciousness of these concerns, and to provide students and other UC community members with grassroots vehicles for activism.

This summer, 2005, is the 60<sup>th</sup> anniversary of the bombing of Hiroshima and Nagasaki, which occurred on August 6 and 9, 1945. Those two instances represent the first and only time so far that nuclear weapons have been used in combat. This atrocity resulted in over 210,000 deaths from the initial blast and subsequent radiation by the end of 1945. The peace and justice community is organizing numerous events for this summer in remembrance of the innocent victims of Hiroshima and Nagasaki, as well as others around the world that suffer from nuclearism and militarism. Our student-facilitated class is in part an effort to get students plugged in to the broader peace and justice movement and recruit additional participants in next summer’s actions.

### **Overview**

Today’s lecture includes a brief primer on the physics of nuclear weapons and a survey of the UC’s historical involvement in nuclear weapons up to the present circumstances of bidding for lab management contracts. The talk concludes with some popular criticisms of the UC-weapons lab relationship.

### **The Physics of Nuclear Weapons**

First of all, how do nuclear weapons work? For that we have to discuss the curve of binding energy, possibly familiar to many of you. There are four fundamental forces that bind together the nuclei of atoms—in order of decreasing strength they are the strong force, the weak

force, the electromagnetic force, and gravitational force. I am not going to speak in detail of these forces—only to mention that some work to hold the nucleus together, and some act to push it apart. For instance, the electromagnetic force is repulsive between like-charged particles. Since the nucleus is comprised of positively-charged protons and neutral neutrons, the electromagnetic force tries to push the nucleus apart. The nucleus stays together because the attractive forces overcome the repulsive forces.

The important thing to remember is that the element iron, with its 26 protons and about 30, on average, neutrons has the most stable, in other words the most tightly bound, nucleus. Elements heavier than iron tend to decay, that is break up, towards an iron configuration; and elements lighter than iron tend to fuse together towards iron. All this is to attain a more stable, that is lower energy, state.

Keeping this in mind, there are two main types of nuclear weapons. The first type, the type used on Hiroshima and Nagasaki, are fission weapons. These use a core of radioactive material such as uranium or plutonium to produce a nuclear chain reaction. The chain reaction of splitting, or fissioning, of large nuclei produces lots of energy that comprises the bomb blast. The second type, so-called thermonuclear weapons, are fusion weapons. They utilize smaller atoms, for instance hydrogen and deuterium—a heavy isotope of hydrogen—to fuel fusion reactions that release enormous amounts of energy. Einstein’s famous equation  $E = mc^2$  describes this. The energy you get out is equal to the mass lost in the fusion reaction times the speed of light squared—an enormous value. This accounts for the Herculean destructive power of thermonuclear weaponry. Thermonuclear weapons themselves typically contain both fission and fusion bombs. The energy released by a fission “primary” triggers the fusion reaction “secondary”.

As previously stated, the bombs used on Hiroshima and Nagasaki were of the less powerful, fission variety. Destructive output of nuclear weapons is measured in “tons,” representing the tonnage of TNT, a conventional explosive, required to generate an equivalent blast. The fission bomb dropped on Hiroshima used about 60 kg of uranium, and produced an explosion equivalent to 15 thousand tons of TNT—15 kilotons. The bomb dropped on Nagasaki used about 6 kg of plutonium to produce a 20 kiloton explosion. For comparison, thermonuclear weapons can produce as much as 50 or 100 Megatons—over three orders of magnitude greater than the bombs unleashed upon Japan.

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<sup>4</sup> Kohn, Walter. *UC Should Discontinue Management of Weapons Research, Development and Production at Los Alamos*. Presentation to the UC Regents Committee on Oversight of the DOE Laboratories, July 15, 2004.

The United States' current nuclear arsenal includes about 7,000 operational nuclear warheads, with about 3,000 additional warheads held in reserve. The combined explosive power of this arsenal is between 3,500 – 4,000 Megatons.<sup>5</sup> For comparison, the total explosive force expended during WWII, in which about 50 million people were killed, was 3 Megatons.

Known nuclear weapons states include the United States, Russia, China, France, Britain, Israel, India, Pakistan, and likely North Korea. Last November, Director General of the International Atomic Energy Agency and chief weapons inspector Mohamed ElBaradei indicated that there is no evidence as yet that Iran has constituted a nuclear weapons program.<sup>6</sup>

### ***The UC and Nuclear Weapons***

The University of California has supported the United States' regime of nuclear weapons development and testing by providing scientists and engineers to work on weapons projects and by overseeing the Department of Energy's two large nuclear weapons laboratories at Livermore, CA and Los Alamos, NM. Lawrence Livermore and Los Alamos National Laboratories have a combined budget of nearly \$3 billion per year, more than 80% of which is directed explicitly to "weapons activities."<sup>7</sup> The UC has exclusively managed these facilities since their inception over half a century ago; but a number of scandals and "systematic management failures" in recent years, such as that that led to last summer's complete work stoppage at LANL, has prompted DOE, through its National Nuclear Security Administration (NNSA), to put the prime management contracts up for competitive bidding. LLNL bids will be solicited during the fall of 2005, with the management contract awarded in May 2006. The UC Regents are currently deliberating over whether to bid for LANL. The LANL contract will be awarded in May 2005.

The ultimate decision whether the UC will compete to manage the weapons labs will be made by the University's governing body—the Regents. In coming weeks we will examine the UC Regents and follow their decision process regarding the LANL contract.

### ***Should Our University Manage the Weapons Labs?***

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<sup>5</sup> Center for Defense Information (<http://www.cdi.org/>)

<sup>6</sup> Collier R, Sterngold J. *Top U.N. inspector slams Bush/ He says invading Iraq has damaged credibility of U.S.* San Francisco Chronicle, Friday, November 5, 2004.

<sup>7</sup> Department of Energy FY 2005 Congressional Budget Request, Laboratory Tables, February 2004.  
<http://www.mbe.doe.gov/budget/05budget/>

Let's look at some of the common criticisms of the University's relationship to the weapons labs:

Public service has been the rationale underlying the UC's historical management of the weapons labs beyond the original contract termination timescale of 90 days after the end of WWII. The UC mission statement indicates that appropriate public service must be "shaped and bounded by the central pervasive mission of discovering and advancing knowledge."<sup>8</sup> As UC Santa Barbara physicist and Nobel Laureate Walter Kohn has noted, the primary mission of the labs—that of nuclear weapons R & D—is "wholly incompatible with the criterion for public service contained in the UC's mission statement." A 1996 study by the University Committee on Research Policy concluded that, "the University's management of the LANL and LLNL does not, on balance, fulfill these conditions of appropriate public service."<sup>9</sup> Thus by facilitating the development of nuclear weapons of mass destruction our University is violating its mission statement.

Pursuit of new nuclear weapons technologies also violates international law. Article VI of the Nuclear Non-Proliferation Treaty, to which the US is a signatory, states: "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a Treaty on general and complete disarmament under strict and effective international control."<sup>10</sup> In July 1996, the International Court of Justice unanimously held that "There exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control...The legal import of [the NPT Article VI] obligation goes beyond that of a mere obligation of conduct; the obligation involved here is an obligation to achieve a precise result -- nuclear disarmament in all its aspects -- by adopting a particular

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<sup>8</sup> UC Mission Statement

<http://www.universityofcalifornia.edu/aboutuc/missionstatement.html>

The full statement, from the University of California Academic Plan, 1974-1978, reads: "The distinctive mission of the University is to serve society as a center of higher learning, providing long-term societal benefits through transmitting advanced knowledge, discovering new knowledge, and functioning as an active working repository of organized knowledge. That obligation, more specifically, includes undergraduate education, graduate and professional education, research, and other kinds of public service, which are shaped and bounded by the central pervasive mission of discovering and advancing knowledge."

<sup>9</sup> University of California Academic Senate Report of the University Committee on Research Policy on the University's Relationship with the Department of Energy Laboratories  
[http://scipp.ucsc.edu/~haber/UC\\_CORP/doereport.html](http://scipp.ucsc.edu/~haber/UC_CORP/doereport.html)

<sup>10</sup> <http://www.state.gov/t/np/trty/16281.htm#treaty>

course of conduct, namely, the pursuit of negotiations on the matter in good faith.”<sup>11</sup>

The 2002 Nuclear Posture Review indicates that the US government intends to return to full-scale testing, and has funded an Enhanced Test Readiness program at the Nevada Test Site.<sup>12</sup> This would violate the Comprehensive Test Ban Treaty, which the US has signed, but not ratified. Our University should not be involved in activities that violate international law. Director General of the International Atomic Energy Agency and chief weapons inspector Mohamed ElBaradei has noted that US policy regarding nuclear proliferation represents a " 'good guys versus bad guys' approach that inevitably leaves some nations seeking to achieve parity...either there must be a demonstrated commitment to move towards nuclear disarmament, or we should resign ourselves to the fact that other countries will pursue a more dangerous parity through proliferation."<sup>13,14</sup> By overseeing the weapons labs the UC is enabling the jingoistic nuclear posture of the US government, which presents serious global nuclear proliferation risks.

Livermore and Los Alamos are nuclear weapons labs—their funds and their mission are “dictated by the DOE, acting as a surrogate for the DOD.”<sup>15</sup> The UC has never been able to exercise influence or control over what goes on at the labs. The principle function of the UC has been to provide a halo of academic respectability to military-driven nuclear weapons work. The reputation and prestige of our University is damaged by this affiliation, and the quality and objectivity of UC science is suspect. Academic freedom is severely curtailed at the weapons labs, where much of the research is classified. The hierarchical organization of the labs resembles much more the Pentagon or a corporation than a university campus—this atmosphere stifles creativity and freedom of thought. Professor Walter Kohn has stated that, “the academic and military cultures are fundamentally incompatible—the former being

unfettered and open, the latter, necessarily contained and secret.”<sup>16</sup>

Proponents of continued UC management of the weapons labs argue that nuclear weapons work will continue with or without UC oversight, and that as a public institution the UC is the most capable manager of such activity. However, an intensive UC-sponsored study indicates that the University has been an inept and delinquent manager of the weapons labs.<sup>17</sup> Continuing security lapses including lost classified data and missing and misplaced equipment as well as substandard response to facility safety issues have plagued UC’s tenure as lab manager.<sup>18,19</sup> Last month, a hermit was discovered living in a cave on LANL property. The hermit’s lighted cave was powered by solar panels, and was fully furnished with a glass front door, a wood stove, and a bed. He had apparently lived there for quite a while, and was discovered when a lab official noticed a tendrill of smoke from the wood stove.<sup>20</sup>

The bidding process for the labs’ contracts is elaborate and costly in both monetary and human resource terms. Recently, the Chancellor of the University of Texas, a potential competitor for the LANL contract, indicated "that the UT System was not going to be able to field the team necessary to undertake that kind of significant responsibility."<sup>21</sup> The defense contractor Lockheed Martin rescinded its intention to bid for LANL because it is “too costly.”<sup>22</sup> The expense that will be incurred to UC to prepare and submit a bid could range from \$5 -

<sup>11</sup> <http://www.icj-cij.org/icjwww/icjhome.htm>

<sup>12</sup> *Up For Sale: Bidding for Management of the Nuclear Weapons Labs*. Western States Legal Foundation Special Report, Fall 2004. [www.wslfweb.org](http://www.wslfweb.org).

<sup>13</sup> Collier R, Sterngold J. *Top U.N. inspector slams Bush/ He says invading Iraq has damaged credibility of U.S.* San Francisco Chronicle, Friday, November 5, 2004.

<sup>14</sup> *In Search of Security: Finding an alternative to nuclear deterrence*. Mohamed ElBaradei. Stanford University Center for International Security and Cooperation. Remarks prepared for the Drell Lecture, 4 November 2004

<sup>15</sup> Schwartz C. *Political Structuring of the Institutions of Science*. In *Naked Science: Anthropological inquiry into boundaries, power and knowledge*. L Nader ed.

<sup>16</sup> Kohn, Walter. *UC Should Discontinue Management of Weapons Research, Development and Production at Los Alamos*. Presentation to the UC Regents Committee on Oversight of the DOE Laboratories, July 15, 2004.

<sup>17</sup> University of California Academic Senate Report of the University Committee on Research Policy on the University’s Relationship with the Department of Energy Laboratories  
[http://scipp.ucsc.edu/~haber/UC\\_CORP/doereport.html](http://scipp.ucsc.edu/~haber/UC_CORP/doereport.html)

A DOE “Blue Ribbon” commission also issued a very critical report of contractor-DOE relations. See US Department of Energy, *Competing the Management and Operations Contracts for DOE’s National Laboratories*, November 24, 2003.

<sup>18</sup> *Up For Sale: Bidding for Management of the Nuclear Weapons Labs*. Western States Legal Foundation Special Report, Fall 2004. [www.wslfweb.org](http://www.wslfweb.org).

<sup>19</sup> Davidson K. *Lapses At Labs Go Back Decades: Long series of federal reports has cited problems at UC-run weapons facilities*. SF Chronicle. Sunday, August 1, 2004.

<sup>20</sup> Rankin A. *Hermit Found Living in Cave on LANL Property*. Albuquerque Journal. Friday, October 29, 2004.

[http://www.abqjournal.com/north/250595north\\_news10-29-04.htm](http://www.abqjournal.com/north/250595north_news10-29-04.htm)

<sup>21</sup> Hacker, Holly K. *UT won’t vie to run Los Alamos nuke plant*. Dallas Morning News, Thursday January 13, 2005.  
<http://www.dallasnews.com/s/dws/dn/education/stories/011405dntexlo.s.4e8f4.html>

<sup>22</sup> Associated Press,

[http://www.mercurynews.com/mld/mercurynews/news/local/states/california/the\\_valley/9345753.htm](http://www.mercurynews.com/mld/mercurynews/news/local/states/california/the_valley/9345753.htm)

\$25 million.<sup>23</sup> This has alarmed some members of the UC community, especially in light of the effects of the budget crunch disproportionately felt by the lowest paid workers at the University. A recent report from the sociology department at UC-Berkeley indicated that 20% of all service workers at Berkeley make less than the City of Berkeley living wage, and 87% of all service workers make less than the California Budget Project's estimate of the hourly wage both parents in a four-person family would need to make in order to achieve a "modest" standard of living in the Bay Area. The wages of UC Berkeley service and clerical workers have been frozen over the past two years—and again for FY 2004-2005 workers have been offered a zero percent pay increase.<sup>24</sup> Members of the University community rightly question whether UC administrators ought to spend University funds on contracts to manage the weapons labs when that money could be spent to better compensate underpaid University employees.

### ***What Is To Be Done?***

Will the UC continue to manage Armageddon through its support of nuclear weapons research at the labs? How will the UC Regents regard the concerns of University faculty, students, and clerical and service workers? What are the philosophical and ethical implications of nuclear weapons research on University science programs? Will a renewed surge from the US government towards developing new nuclear weapons prompt a return to full-scale nuclear testing? What are the potential effects of the current US nuclear posture on international nuclear proliferation? These are some of the tough issues we want to address in this course. It is our hope that this course will serve as a hub of information and organization and provide UC students with empowering vehicles for activism around issues of nuclearism and militarism that shape our University, society, and world.

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<sup>23</sup> Bond-Graham D. *Bidding for a Bomb Lab*. Z Magazine, October 2003, vol 16 no. 10.

<sup>24</sup> Purser G, Schalet A, and Sharone O. *Berkeley's Betrayal: Wages and Working Conditions at Cal*. <http://sisc.Berkeley.edu/cac/default>. <http://www.berkeleybetrayal.org>.