PRC THEFT OF U.S. THERMONUCLEAR WARHEAD DESIGN INFORMATION

The People's Republic of China (PRC) has stolen classified information on all of the United States' most advanced thermonuclear warheads, and several of the associated reentry vehicles. These thefts are the result of an intelligence collection program spanning two decades, and continuing to the present. The PRC intelligence collection program included espionage, review of unclassified publications, and extensive interactions with scientists from the Department of Energy's national weapons laboratories.

The stolen U.S. secrets have helped the PRC fabricate and successfully test modern strategic thermonuclear weapons. The stolen information includes classified information on seven U.S. thermonuclear warheads, including every currently deployed thermonuclear warhead in the U.S. intercontinental ballistic missile arsenal. Together, these include the W-88 Trident D-5 thermonuclear warhead, and the W-56 Minuteman II, the W-62 Minuteman III, the W-70 Lance, the W-76 Trident C-4, the W-78 Minuteman III Mark 12A, and the W-87 Peacekeeper thermonuclear warheads. The stolen information also includes classified design information for an enhanced radiation weapon (commonly known as the "neutron bomb"), which neither the United States, nor any other nation, has ever deployed.

In addition, in the mid-1990s the PRC stole from a U.S. national weapons laboratory classified U.S. thermonuclear weapons information that cannot be identified in this unclassified Report. Because this recent espionage case is currently under investigation and involves sensitive intelligence sources and methods, the Clinton administration has determined that further information can not be made public.

The W-88 is a miniaturized, tapered thermonuclear warhead. It is the United States' most sophisticated strategic thermonuclear weapon. In the U.S. arsenal, the W-88 warhead is mated to the D-5 submarine-launched ballistic missile carried aboard the Trident nuclear submarine. The United States learned about the theft of the W-88 Trident D-5 warhead information, as well as about the theft of information regarding several other thermonuclear weapons, in 1995.

On two occasions, the PRC has stolen classified U.S. information about neutron bomb warheads from a U.S. national weapons laboratory. The United States learned of these thefts of classified information on the neutron bomb in 1996 and in

the late 1970s, when the first theft — including design information on the W-70 warhead — occurred. The W-70 warhead contains elements that may be used either as a strategic thermonuclear weapon, or as an enhanced radiation weapon ("neutron bomb"). The PRC subsequently tested the neutron bomb. The U.S. has never deployed a neutron weapon.

In addition, the Select Committee is aware of other PRC thefts of U.S. thermonuclear weapons-related secrets. The Clinton administration has determined that further information about these thefts cannot be publicly disclosed.

The Select Committee judges that the PRC will exploit elements of the stolen U.S. design information for the development of the PRC's new generation strategic thermonuclear warheads. Current PRC silo-based missiles were designed for large, multi-megaton thermonuclear warheads roughly equivalent to U.S. warheads of the late 1950s. The PRC plans to supplement these silo-based missiles with smaller, modern mobile missiles that require smaller warheads. The PRC has three mobile ICBM programs currently underway – two road-mobile and one submarine launched program – all of which will be able to strike the United States.

The first of these new People's Liberation Army (PLA) mobile ICBMs, the DF-31, may be tested in 1999 and could be deployed as soon as 2002. The DF-31 ICBM and the PRC's other new generation mobile ICBMs will require smaller, more compact warheads. The stolen U.S. information on the W-70 or W-88 Trident D-5 will be useful for this purpose.

The PRC has the infrastructure and technical ability to use elements of the stolen U.S. warhead design information in the PLA's next generation of thermonuclear weapons. If the PRC attempted to deploy an exact replica of the U.S. W-88 Trident D-5 warhead, it would face considerable technical challenges. However, the PRC could build modern thermonuclear warheads based on stolen U.S. design information, including the stolen W-88 design information, using processes similar to those developed or available in a modern aerospace or precision guided munitions industry. The Select Committee judges that the PRC has such infrastructure and is capable of producing small thermonuclear warheads based on the stolen U.S. design information, including the stolen W-88 information.

The Select Committee judges that the PRC is likely to continue its work on advanced thermonuclear weapons based on the stolen U.S. design information. The PRC could begin serial production of advanced thermonuclear weapons based on stolen U.S. design information during the next decade in connection with the development of its new generation of intercontinental ballistic missiles.

The Select Committee judges that the PRC's acquisition of U.S. classified information regarding thermonuclear warhead designs from the Department of Energy's national weapons laboratories saved the PRC years of effort and resources, and helped the PRC in its efforts to fabricate and successfully test a new generation of thermonuclear warheads. The PRC's access to, and use of, classified U.S. information does not immediately alter the strategic balance between the U.S. and PRC. Once the PRC's small, mobile strategic ballistic missiles are deployed, however, they will be far more difficult to locate than the PRC's current silo-based missiles. This will make the PRC's strategic nuclear force more survivable. Small, modern nuclear warheads also enable the PRC to deploy multiple reentry vehicles (MRVs or MIRVs, multiple independently-targetable reentry vehicles) on its ICBMs should it choose to do so.

The PRC's collection of intelligence on smaller U.S. thermonuclear warheads began in the 1970s, when the PRC recognized its weaknesses in physics and the deteriorating status of its nuclear weapons programs. The Select Committee judges that the PRC's intelligence collection efforts to develop modern thermonuclear warheads are focused primarily on the U.S. Department of Energy's National Laboratories at:

- **Los Alamos**
- **Lawrence Livermore**
- **Oak Ridge**
- **Sandia**

The FBI has investigated a number of U.S. National Laboratory employees in connection with suspected espionage.

The Select Committee judges that the U.S. national weapons laboratories have been and are targeted by PRC espionage, and almost certainly remain penetrated by the PRC today.

The United States did not become fully aware of the magnitude of the counterintelligence problem at Department of Energy national weapons laboratories until 1995. A series of PRC nuclear weapons test explosions from 1992 to 1996 began a debate in the U.S. Government about whether the PRC's designs for its new generation of nuclear warheads were in fact based on stolen U.S. classified information. The apparent purpose of these PRC tests was to develop smaller, lighter thermonuclear warheads, with an increased yield-to-weight ratio. In 1995, a "walk-in" approached the Central Intelligence Agency outside the PRC and provided an official PRC document classified "Secret" that contained specific design information on the W-88 Trident D-5, and technical information on other thermonuclear warheads. The CIA later determined that the "walk-in" was directed by the PRC intelligence services. Nonetheless, CIA and other Intelligence Community analysts that reviewed the document concluded that it contained U.S. warhead design information.

The National Security Advisor was briefed on PRC thefts of classified U.S. thermonuclear warhead design information in April 1996 (when he was the Deputy National Security Advisor), and again in August 1997. In response to specific interrogatories from the Select Committee, the National Security Advisor informed the Select Committee that the President was not briefed about the issue and the long-term counterintelligence problems at the Department of Energy until early 1998. The Secretary of Energy was briefed about the matter in late 1995 and early 1996. At the writing of this report, the Secretary of Defense has been briefed, but not the Secretaries of State and Commerce.

Congress was not provided adequate briefings on the extent of the PRC's espionage program.

Under Presidential Decision Directive 61 issued in February 1998, the Department of Energy was required to implement improved counterintelligence measures. In December 1998, the Department of Energy began to implement a series of recommended improvements to its counterintelligence program approved by

Secretary Richardson in November 1998. Based on testimony by the new head of the Department of Energy's counterintelligence program, the unsuccessful history of previous counterintelligence programs at the Department of Energy, and other information that is not publicly available, the Select Committee judges that the new counterintelligence program at the Department of Energy will not be even minimally effective until at least the year 2000.

Since the collapse of the Soviet Union, and continuing today, Russia is cooperating with the PRC in numerous military and civilian programs, including the PRC's civilian nuclear program. The Select Committee is concerned about the possibility of cooperation between Russia and the PRC on nuclear weapons. The Select Committee judges that Russian nuclear weapons testing technology and experience could significantly assist the PRC's nuclear weapons program, including the PRC's exploitation of stolen U.S. thermonuclear warhead design information. This is especially true if the PRC complies with the Comprehensive Test Ban Treaty, which does not permit the physical testing of nuclear weapons.

PRC THEFT OF U.S. THERMONUCLEAR WARHEAD DESIGN INFORMATION

The People's Republic of China's penetration of our national weapons laboratories spans at least the past several decades, and almost certainly continues today.

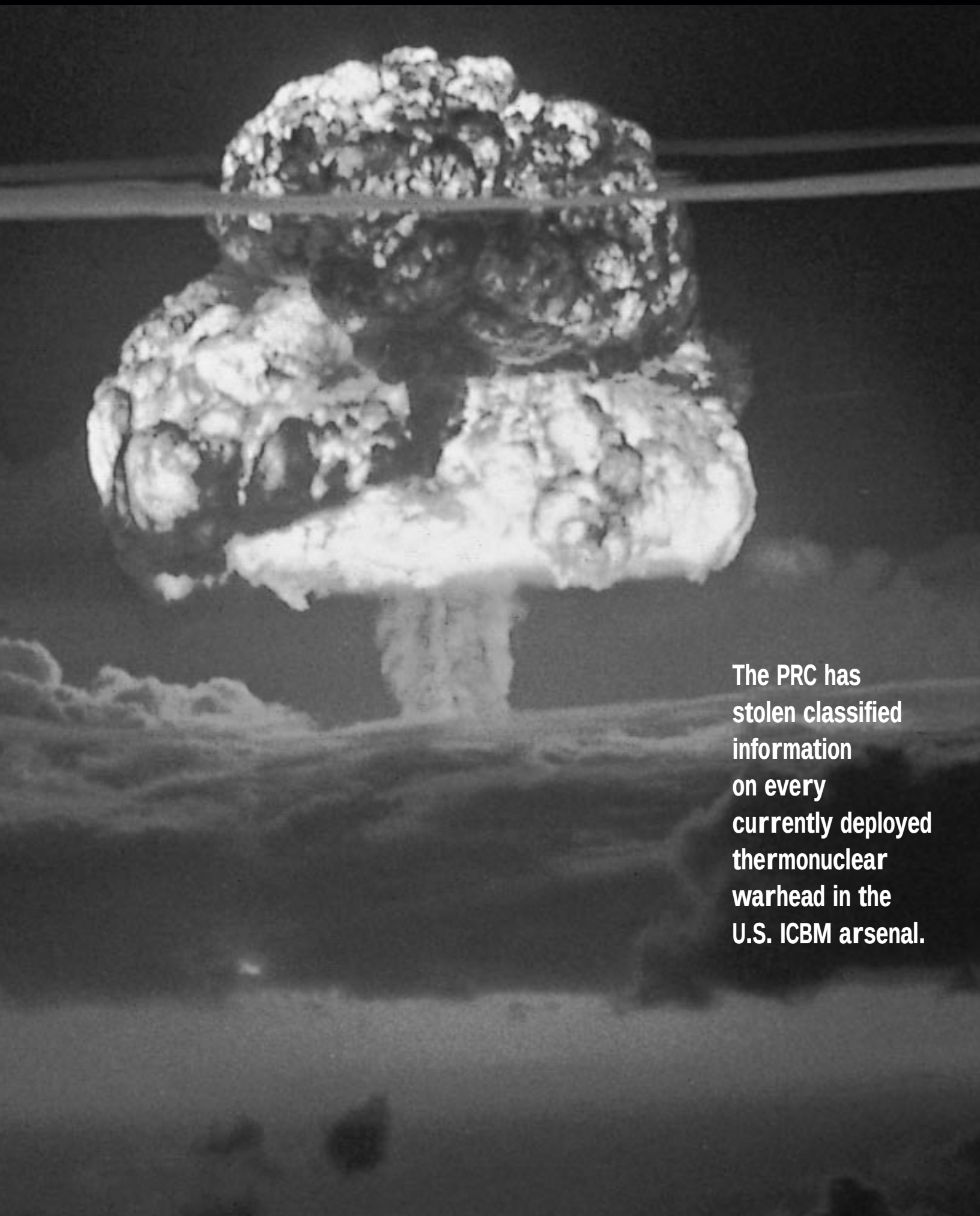
The PRC's nuclear weapons intelligence collection efforts began after the end of the Cultural Revolution in 1976, when the PRC assessed its weaknesses in physics and the deteriorating status of its nuclear weapons programs.

The PRC's warhead designs of the late 1970s were large, multi-megaton thermonuclear weapons that could only be carried on large ballistic missiles and aircraft. The PRC's warheads were roughly equivalent to U.S. warheads designed in the 1950s. The PRC may have decided as early as that time to pursue more advanced thermonuclear warheads for its new generation of ballistic missiles.

The PRC's twenty-year intelligence collection effort against the U.S. has been aimed at this goal. The PRC employs a "mosaic" approach that capitalizes on the collection of small bits of information by a large number of individuals, which is then pieced together in the PRC. This information is obtained through espionage, rigorous review of U.S. unclassified technical and academic publications, and extensive interaction with U.S. scientists and Department of Energy laboratories.

The Select Committee judges that the PRC's intelligence collection efforts to develop modern thermonuclear warheads are focused primarily on the Los Alamos, Lawrence Livermore, Sandia, and Oak Ridge National Laboratories.

As a result of these efforts, the PRC has stolen classified U.S. thermonuclear design information that helped it fabricate and successfully test a new generation of strategic warheads.



The PRC has stolen classified information on every currently deployed thermonuclear warhead in the U.S. ICBM arsenal.

The PRC stole classified information on every currently deployed U.S. intercontinental ballistic missile (ICBM) and submarine-launched ballistic missile (SLBM). The warheads for which the PRC stole classified information include: the W-56 Minuteman II ICBM; the W-62 Minuteman III ICBM; the W-70 Lance short-range ballistic missile (SRBM); the W-76 Trident C-4 SLBM; the W-78 Minuteman III Mark 12A ICBM; the W-87 Peacekeeper ICBM; and the W-88 Trident D-5 SLBM. The W-88 warhead is the most sophisticated strategic nuclear warhead in the U.S. arsenal. It is deployed on the Trident D-5 submarine-launched missile.

In addition, in the mid-1990s the PRC stole from a U.S. national weapons laboratory classified U.S. thermonuclear weapons information that cannot be identified in this unclassified Report. Because this recent espionage case is currently under investigation and involves sensitive intelligence sources and methods, the Clinton administration has determined that further information may not be made public.

The PRC also stole classified information on U.S. weapons design concepts, on weaponization features, and on warhead reentry vehicles (the hardened shell that protects a warhead during reentry).

The PRC may have acquired detailed documents and blueprints from the U.S. national weapons laboratories.

The U.S. Intelligence Community reported in 1996 that the PRC stole neutron bomb technology from a U.S. national weapons laboratory. The PRC had previously stolen design information on the U.S. W-70 warhead in the late 1970s; that earlier theft, which included design information, was discovered several months after it took place. The W-70 has elements that can be used as a strategic thermonuclear warhead or an enhanced radiation ("neutron bomb") warhead. The PRC tested a neutron bomb in 1988.

Classified U.S. Nuclear Weapons Information Acquired by the PRC

Designation	Design Laboratory	Weapon Platform
W-88	Los Alamos	Trident D-5 SLBM
W-87	Lawrence Livermore	Peacekeeper/M-X ICBM
W-78	Los Alamos	Minuteman III Mark 12A ICBM
W-76	Los Alamos	Trident C-4 SLBM
W-70	Lawrence Livermore	Lance SRBM
W-62	Lawrence Livermore	Minuteman III ICBM
W-56	Lawrence Livermore	Minuteman II ICBM

The PRC may have also acquired classified U.S. nuclear weapons computer codes from U.S. national weapons laboratories. The Select Committee believes that nuclear weapons computer codes remain a key target for PRC espionage. Nuclear weapons codes are important for understanding the workings of nuclear weapons and can assist in weapon design, maintenance, and adaptation. The PRC could make use of this information, for example, to adapt stolen U.S. thermonuclear design information to meet the PRC's particular needs and capabilities.

During the mid-1990s, it was learned that the PRC had acquired U.S. technical information about insensitive high explosives. Insensitive high explosives are a component of certain thermonuclear weapons. Insensitive high explosives are less energetic than high explosives used in some other thermonuclear warheads, but have advantages for other purposes, such as thermonuclear warheads used on mobile missiles.

The PRC thefts from our national weapons laboratories began at least as early as the late 1970s, and significant secrets are known to have been stolen as recently as the mid-1990s. Such thefts almost certainly continue to the present.

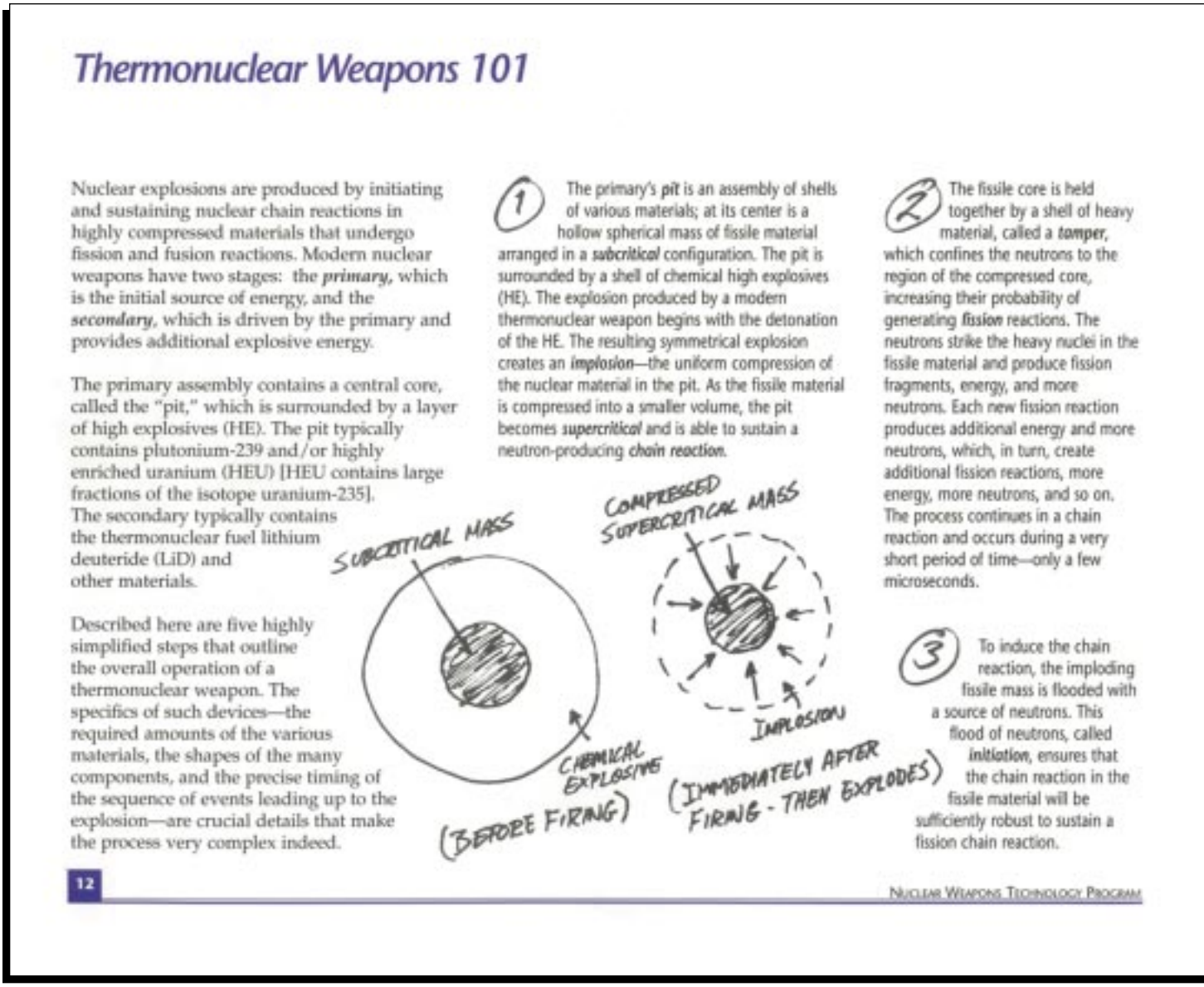
The Clinton administration has determined that additional information about PRC thefts included in this section of the Select Committee's Report cannot be publicly disclosed.

The PRC's Next Generation Nuclear Warheads

The PRC has acquired U.S. nuclear weapons design information that could be utilized in developing the PRC's next generation of modern thermonuclear warheads.

The Department of Energy identifies two general design paths to the development of modern thermonuclear warheads:

- **The first path, which apparently has been followed by the Russians, emphasizes simplicity and reliability in design**
- **The second path, which the U.S. has taken, utilizes innovative designs and lighter-weight warheads**



Thermonuclear Weapons 101

Nuclear explosions are produced by initiating and sustaining nuclear chain reactions in highly compressed materials that undergo fission and fusion reactions. Modern nuclear weapons have two stages: the ***primary***, which is the initial source of energy, and the ***secondary***, which is driven by the primary and provides additional explosive energy.

The primary assembly contains a central core, called the "pit," which is surrounded by a layer of high explosives (HE). The pit typically contains plutonium-239 and/or highly enriched uranium (HEU) [HEU contains large fractions of the isotope uranium-235]. The secondary typically contains the thermonuclear fuel lithium deuteride (LiD) and other materials.

Described here are five highly simplified steps that outline the overall operation of a thermonuclear weapon. The specifics of such devices—the required amounts of the various materials, the shapes of the many components, and the precise timing of the sequence of events leading up to the explosion—are crucial details that make the process very complex indeed.

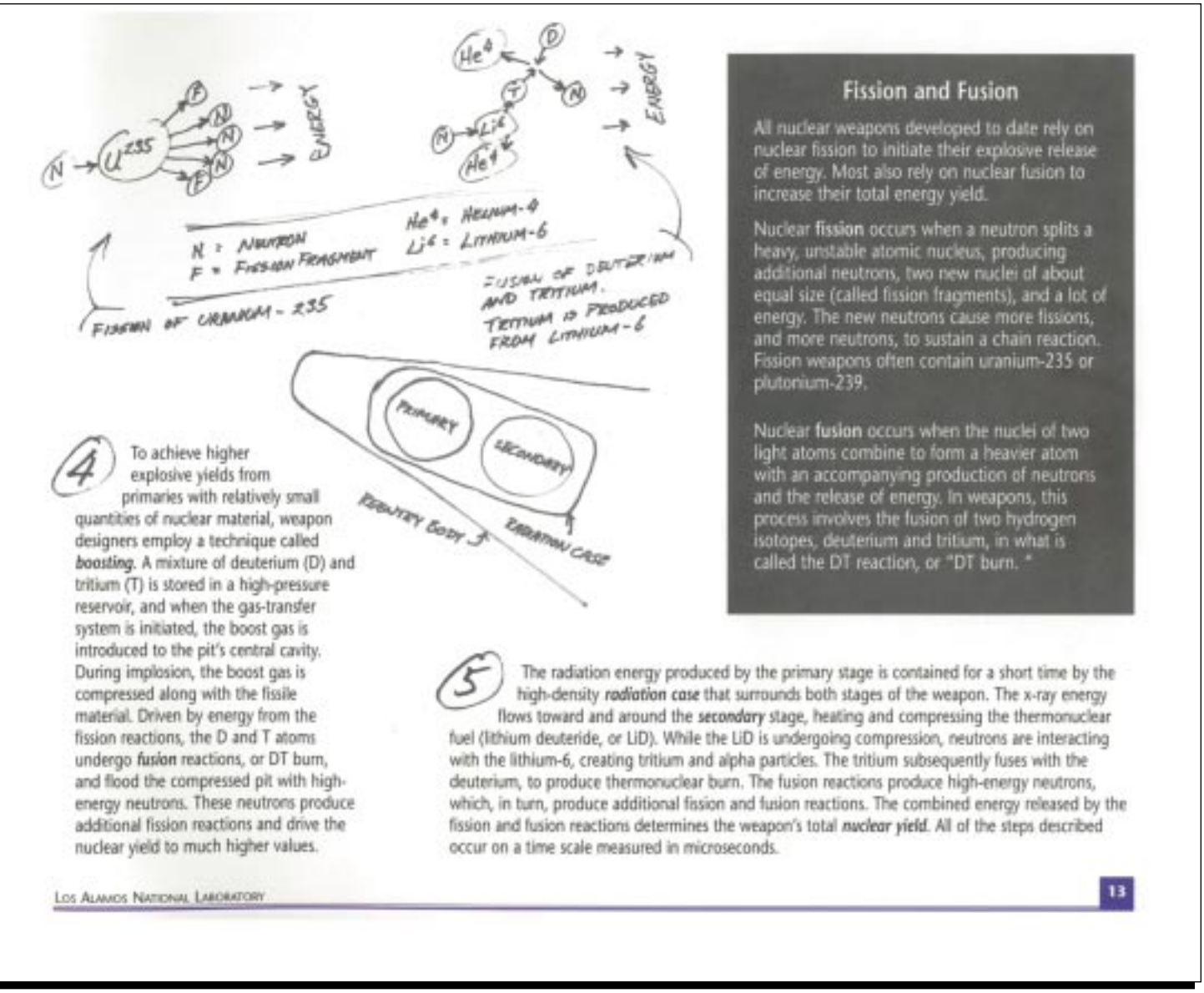
1 The primary's ***pit*** is an assembly of shells of various materials; at its center is a hollow spherical mass of fissile material arranged in a ***subcritical*** configuration. The pit is surrounded by a shell of chemical high explosives (HE). The explosion produced by a modern thermonuclear weapon begins with the detonation of the HE. The resulting symmetrical explosion creates an ***implosion***—the uniform compression of the nuclear material in the pit. As the fissile material is compressed into a smaller volume, the pit becomes ***supercritical*** and is able to sustain a neutron-producing ***chain reaction***.

2 The fissile core is held together by a shell of heavy material, called a ***tamper***, which confines the neutrons to the region of the compressed core, increasing their probability of generating ***fission*** reactions. The neutrons strike the heavy nuclei in the fissile material and produce fission fragments, energy, and more neutrons. Each new fission reaction produces additional energy and more neutrons, which, in turn, create additional fission reactions, more energy, more neutrons, and so on. The process continues in a chain reaction and occurs during a very short period of time—only a few microseconds.

3 To induce the chain reaction, the imploding fissile mass is flooded with a source of neutrons. This flood of neutrons, called ***initiation***, ensures that the chain reaction in the fissile material will be sufficiently robust to sustain a fission chain reaction.

Visitors to Los Alamos National Laboratory are provided a 72-page publication that provides, among other things, a primer on the design of thermonuclear weapons.

The Select Committee judges that the combination of the PRC's preference for U.S. designs, the PRC's theft of design information on our most advanced thermonuclear warheads, and the PRC's demand for small, modern warheads for its new generation of mobile intercontinental ballistic missiles will result in the PRC emulating the U.S. design path to develop its next generation of thermonuclear warheads.



The PRC has already begun working on smaller thermonuclear warheads. During the l990s, the PRC was working to complete testing of its modern thermonuclear weapons before it signed the Comprehensive Test Ban Treaty in 1996.[1] The PRC conducted a series of nuclear tests from 1992 to 1996. Based on what is known about PRC nuclear testing practices, combined with data on PRC warhead

yield and on PRC missile development, it is clear that the purpose of the 1992 to 1996 test series was to develop small, light warheads for the PRC's new nuclear forces.[2]

These tests led to suspicions in the U.S. Intelligence Community that the PRC had stolen advanced U.S. thermonuclear warhead design information. These suspicions were definitely confirmed by the "walk-in" information received in 1995.

The Select Committee judges that the PRC is developing for its next generation of road-mobile intercontinental ballistic missiles smaller, more compact thermonuclear warheads that exploit elements of stolen U.S. design information, including the stolen design information from the U.S. W-70 Lance warhead or the W-88 Trident D-5 warhead.

The timeline on the next two-page spread shows an unclassified history of the PRC's thermonuclear weapons development and its acquisition of classified information from the United States.

Completing the development of its next-generation warhead poses challenges for the PRC. The PRC may not currently be able to match precisely the exact explosive power and other features of U.S. weapons. Nonetheless, the PRC may be working toward this goal, and the difficulties it faces are surmountable. Work-arounds exist, using processes similar to those developed or available in a modern aerospace or precision-guided munitions industry. The PRC possesses these capabilities already.

The Impact of the PRC's Theft of U.S. Thermonuclear Warhead Design Information

Mobile and Submarine-Launched Missiles

The main application of the stolen U.S. thermonuclear warhead information will likely be to the PRC's next-generation intercontinental ballistic missiles.

The PRC is developing several new, solid-propellant, mobile intercontinental ballistic missiles. These include both road-mobile and submarine-launched intercontinental ballistic missiles.

Road-mobile ballistic missiles and submarine-launched ballistic missiles require smaller, more advanced thermonuclear warheads. The Select Committee judges it is likely that the PRC will use a new, smaller thermonuclear warhead on its next generation road-mobile, solid-propellant ICBM, the DF-31.

The DF-31 is likely to undergo its first test flight in 1999, and could be deployed as early as 2002. Introduction of the PRC's new, smaller thermonuclear warhead into PLA service could coincide with the initial operational capability of the new road-mobile DF-31 ballistic missile system.

The Select Committee judges that the PRC's thermonuclear warheads will exploit elements of the U.S. W-70 Lance or W-88 Trident D-5 warheads. While the PRC might not reproduce exact replicas of these U.S. thermonuclear warheads, elements of the PRC's devices could be similar.

Acceleration of PRC Weapons Development

The PRC's theft of classified U.S. weapons design information saved the PRC years of effort and resources in developing its new generation of modern thermonuclear warheads. It provided the PRC with access to design information that worked and was within the PRC's ability to both develop and test. And it saved the PRC from making mistakes or from pursuing blind alleys.

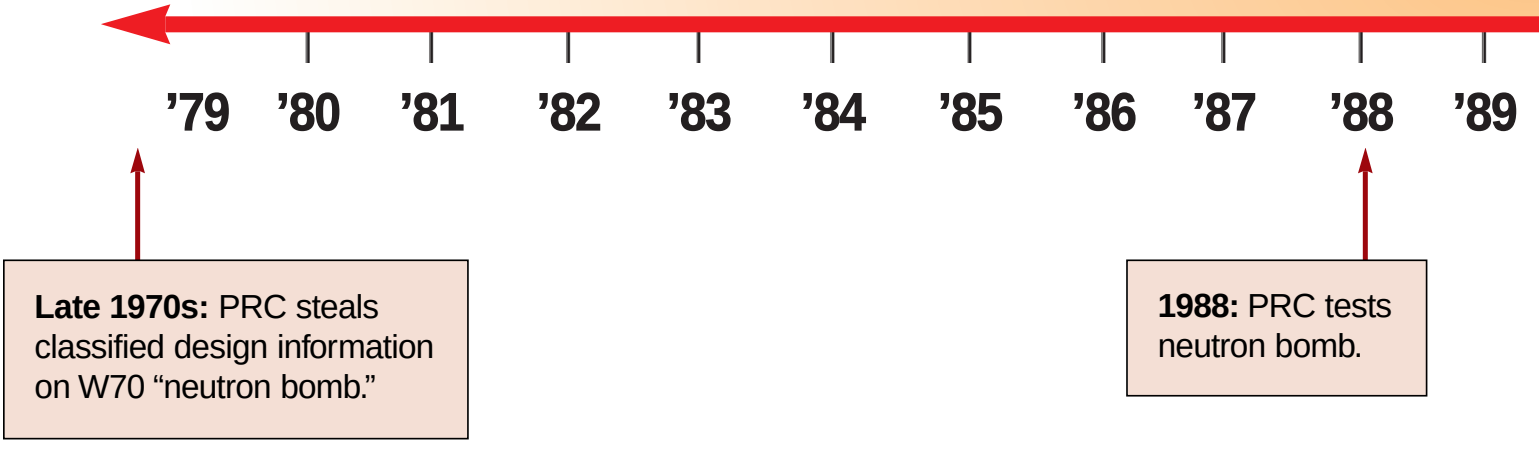
The loss of design information from the Department of Energy's national weapons laboratories helped the PRC in its efforts to fabricate and successfully test its next generation of nuclear weapons designs. These warheads give the PRC small, modern thermonuclear warheads roughly equivalent to current U.S. warhead yields.

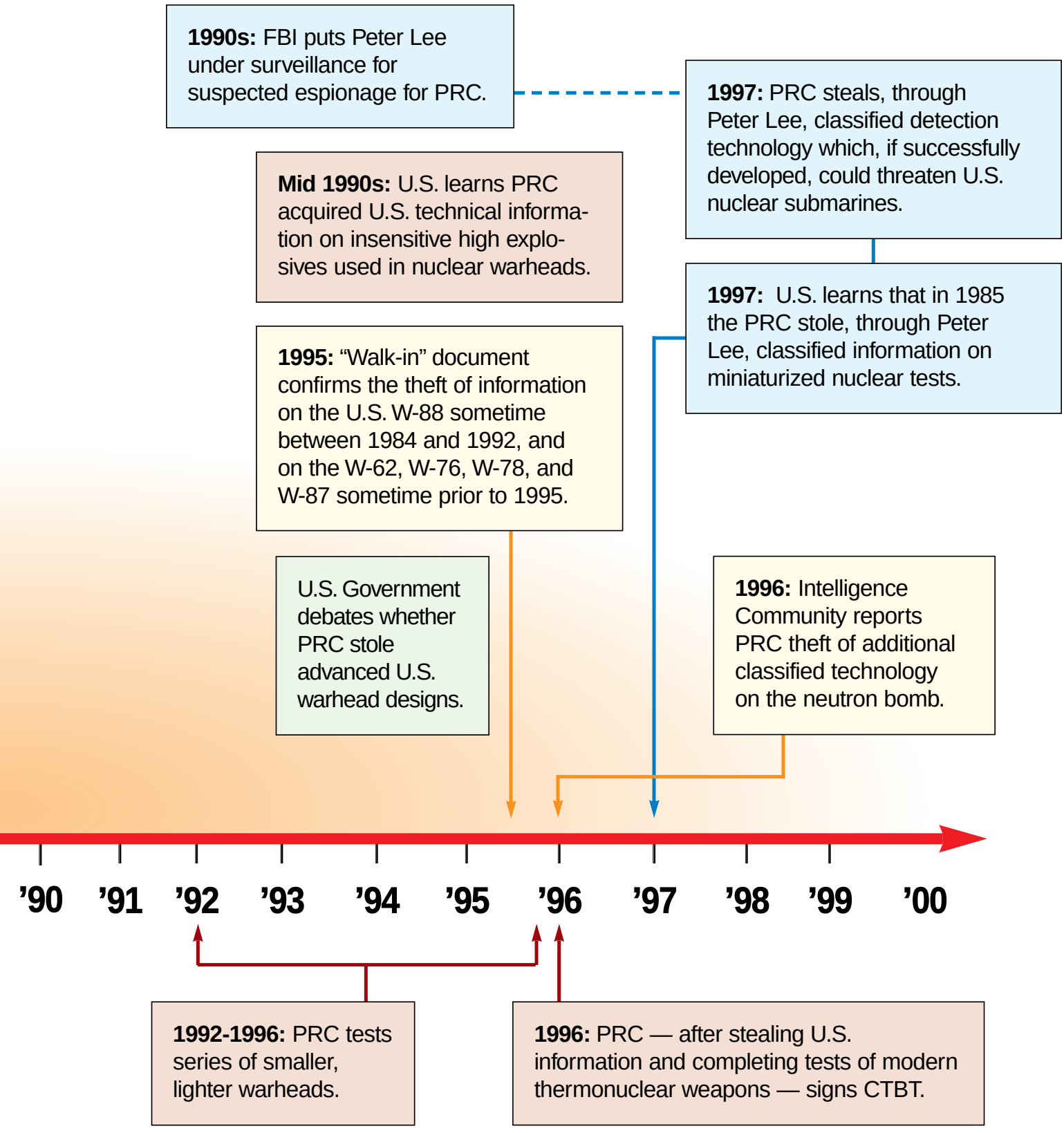
Assessing the extent to which design information losses accelerated the PRC's nuclear weapons development is complicated because so much is unknown. The full extent of U.S. information that the PRC acquired and the sophistication of the PRC's indigenous design capabilities are unclear. Moreover, there is the possibility of third country assistance to the PRC's nuclear weapons program, which could also assist the PRC's exploitation of the stolen U.S. nuclear weapons information. Nonetheless, it is patent that the PRC has stolen significant classified U.S. design information on our most modern thermonuclear warheads.

U.S. Knowledge of PRC Weapons Thefts: An Unclassified History

For decades, and continuing today, the PRC has been acquiring classified information on America's nuclear weapons program in order to develop its own program.

The United States did not become fully aware of the magnitude of the counterintelligence problem at U.S. national weapons laboratories until 1995.




1990s: FBI puts Peter Lee under surveillance for suspected espionage for PRC.
1997: PRC steals, through Peter Lee, classified detection technology which, if successfully developed, could threaten U.S. nuclear submarines.
Mid 1990s: U.S. learns PRC acquired U.S. technical information on insensitive high explosives used in nuclear warheads.
1997: U.S. learns that in 1985 the PRC stole, through Peter Lee, classified information on miniaturized nuclear tests.
1995: "Walk-in" document confirms the theft of information on the U.S. W-88 sometime between 1984 and 1992, and on the W-62, W-76, W-78, and W-87 sometime prior to 1995.
U.S. Government debates whether PRC stole advanced U.S. warhead designs.
1996: Intelligence Community reports PRC theft of additional classified technology on the neutron bomb.
'90
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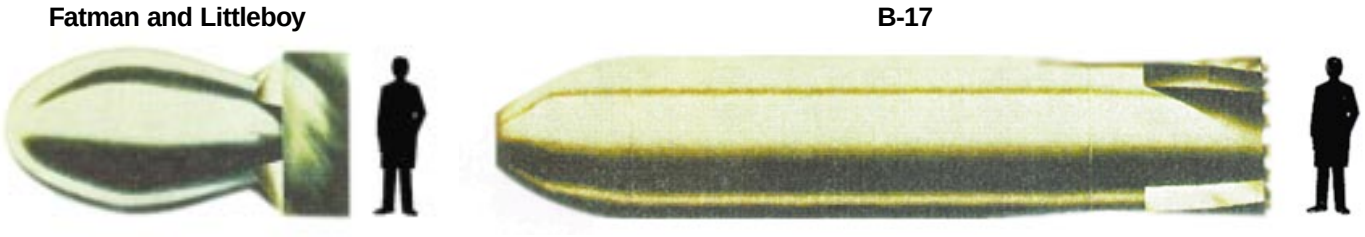
1992-1996: PRC tests series of smaller, lighter warheads.
1996: PRC — after stealing U.S. information and completing tests of modern thermonuclear weapons — signs CTBT.

While it is sometimes argued that eventually the PRC might have been able to produce and test an advanced and modern thermonuclear weapon on its own, the PRC had conducted only 45 nuclear tests in the more than 30 years from 1964 to 1996 (when the PRC signed the Comprehensive Test Ban Treaty), which would have been insufficient for the PRC to have developed advanced thermonuclear warheads on its own. This compares to the approximately 1,030 tests by the United States, 715 tests by the Soviet Union, and 210 by France.[3]

The following illustrates the evolution of smaller U.S. warheads.[4]

Size Comparison of U.S. Nuclear Warheads

Early Development



Single Warhead Development

SINGLE WARHEADS

W58 Polaris
W56 Minuteman II
W47 Polaris

Multiple Independent Reentry Vehicle (MIRV) Development

MIRV WARHEADS

W88 Trident
W87 Pershing
W78 Minuteman III
W76 Trident C-4
W68 Posiedon
W62 Minuteman III

The first U.S. nuclear warheads, such as Fatman, Littleboy and the B-17, were very large in size. Over time, as technology became more sophisticated, the warheads shrunk in size.

Effect on PRC Nuclear Doctrine

Deploying new thermonuclear weapons provides the PRC with additional doctrinal and operational options for its strategic forces that, if exercised, would be troublesome for the United States.

Smaller, more efficient thermonuclear warheads would provide the PRC with the opportunity to develop and deploy a multiple independently-targetable reentry vehicle (MIRV) should it decide to do so. These smaller designs would allow the use of lighter and faster reentry vehicles that may be better able to stress and to overcome ballistic missile defenses.

The following two pages illustrate the development of smaller, more efficient U.S. thermonuclear warheads, specifically the W-87 Peacekeeper, a warhead for which the PRC stole classified U.S. weapons information.

The PRC has expressed considerable opposition to U.S. deployment of ballistic missile defenses.

Other advantages of increased warhead yield-to-weight ratios include extended missile ranges and accuracy improvements. Smaller warheads result in a more compact missile payload, extending the range of ballistic missiles. This permits the use of smaller-diameter sea-launched ballistic missiles and mobile missiles to strike long-range targets. Longer range could enable PRC ballistic missile submarines to strike the U.S. from within PRC waters, where they can operate safely.

Multiple Warhead Development

The deployment of multiple warheads on a single missile requires smaller warheads that the PRC has not possessed.

The Select Committee has no information on whether the PRC currently intends to develop and deploy multiple independently targetable reentry vehicle systems. However, the Select Committee is aware of reports that the PRC has undertaken efforts related to multiple warhead technology.

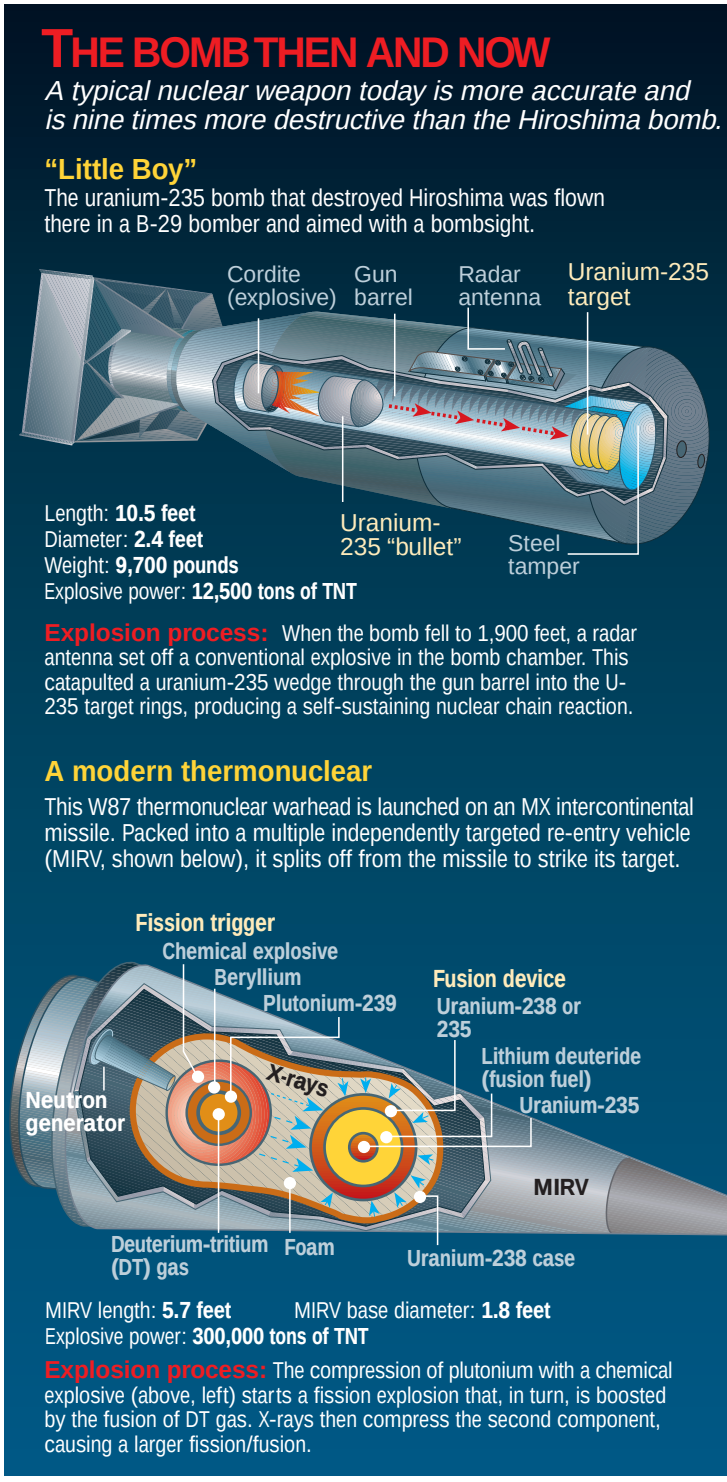
Experts believe that the PRC currently has the technical capability to develop and deploy silo-based ballistic missiles with multiple reentry vehicles (MRVs) and multiple independently-targetable reentry vehicles (MIRVs). Experts also agree that the PRC could develop and deploy its new generation of mobile intercontinental ballistic missiles with MRVs or MIRVs within a short period of years after a decision to do so, and consistent with the presumed timeframe for its planned deployment of its next-generation intercontinental ballistic missiles.

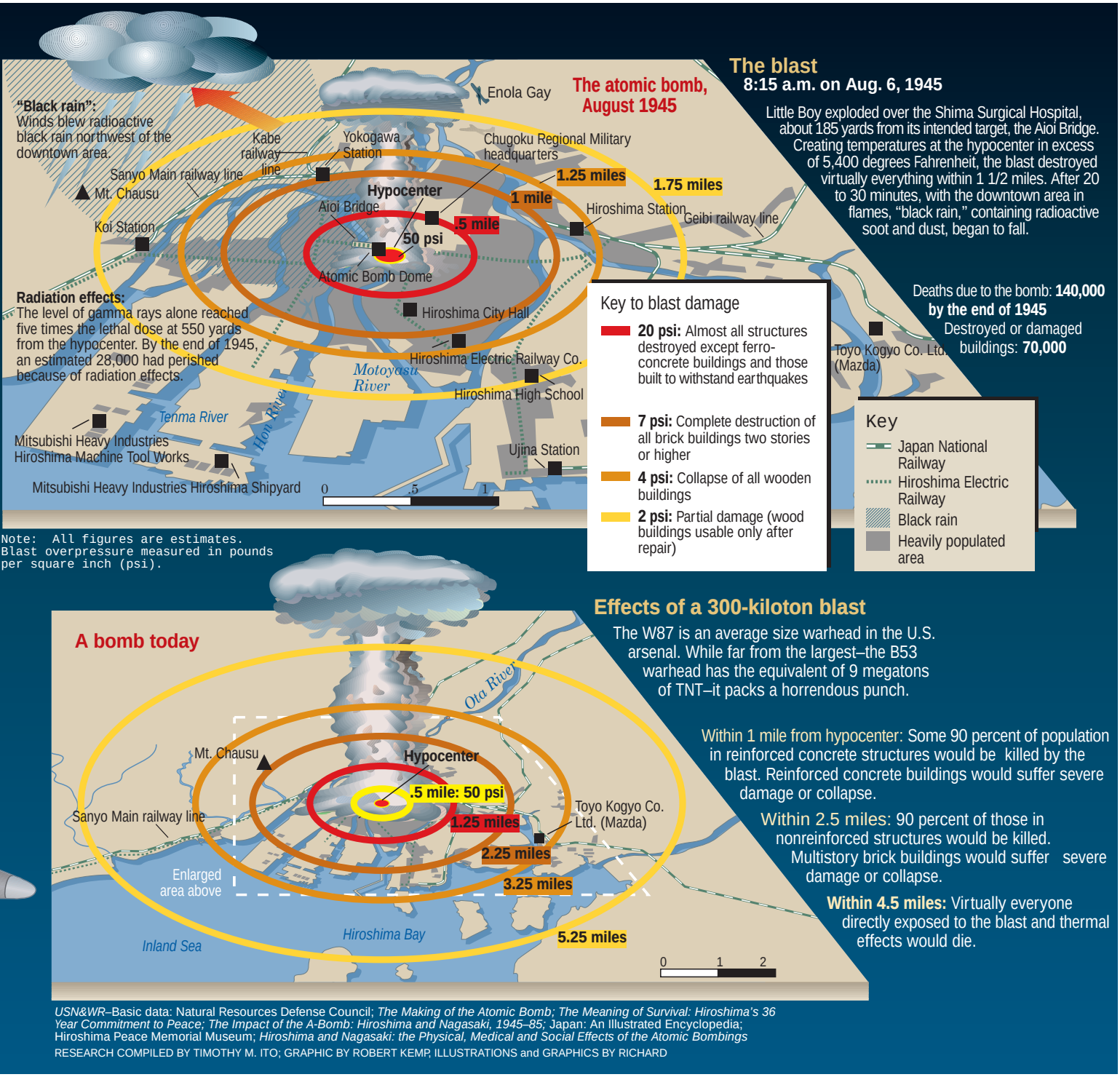
Proliferation

The PRC is one of the world's leading proliferators of weapons technologies. Concerns about the impact of the PRC's thefts of U.S. thermonuclear warhead design information, therefore, include the possible proliferation of the world's most sophisticated nuclear weapons technology to nations hostile to the United States.

Russian Assistance to the PRC's Nuclear Weapons Program

After the fall of the Soviet Union, the PRC and Russian scientists became increasingly cooperative in civilian nuclear technology, and apparently, military technology. The Select Committee is concerned that the growing cooperation between Russia and the PRC is an indication of current or future nuclear weapons cooperation. The Select Committee judges that Russia's nuclear weapons





USN&WR–Basic data: Natural Resources Defense Council; *The Making of the Atomic Bomb; The Meaning of Survival: Hiroshima's 36 Year Commitment to Peace; The Impact of the A-Bomb: Hiroshima and Nagasaki, 1945–85;* Japan: An Illustrated Encyclopedia; Hiroshima Peace Memorial Museum; *Hiroshima and Nagasaki: the Physical, Medical and Social Effects of the Atomic Bombings*

RESEARCH COMPILED BY TIMOTHY M. ITO; GRAPHIC BY ROBERT KEMP, ILLUSTRATIONS and GRAPHICS BY RICHARD

U.S. News & World Report

testing technology and experience could significantly assist the PRC with its nuclear weapons program under the Comprehensive Test Ban Treaty, which does not permit physical testing.

While the PRC could share its knowledge of U.S. advanced thermonuclear warhead designs with Russia, Russia may not be interested in deviating from its past developmental path, since existing Russian warhead designs are apparently simple and reliable. The large throw-weight of Russian ballistic missiles has given them less cause for concern about the size and weight of their warheads. Russia's nuclear stockpile maintenance requirements under a Comprehensive Test Ban Treaty are thus very different than those of the United States.

The prospect of PRC-Russian cooperation, if that were to include military cooperation, would give rise to concerns in several areas, including nuclear weapons development and nuclear stockpile maintenance, nuclear weapons modeling and simulation, and nuclear weapons testing data.

How the PRC Acquired Thermonuclear Warhead Design Information from the United States: PRC Espionage and Other PRC Techniques

The Select Committee judges that the PRC's intelligence collection efforts to develop modern thermonuclear warheads have focused primarily on the following U.S. National Laboratories: Los Alamos, Lawrence Livermore, Oak Ridge, and Sandia. These efforts included espionage, rigorous review of U.S. unclassified technical and academic publications, and extensive interaction with U.S. scientists and Department of Energy laboratories.

Espionage played a central part in the PRC's acquisition of classified U.S. thermonuclear warhead design secrets. In several cases, the PRC identified lab employees, invited them to the PRC, and approached them for help, sometimes playing upon ethnic ties to recruit individuals.

The PRC also rigorously mined unclassified technical information and academic publications, including information from the National Technical Information

Center and other sources. PRC scientists have even requested reports via e-mail from scientists at the U.S. national weapons laboratories. Peter Lee, who had been a scientist at both Lawrence Livermore and Los Alamos National Laboratories and was convicted in 1997 of passing classified information to the PRC, gave the PRC unclassified technical reports upon request. The PRC also learned about conventional explosives for nuclear weapon detonation from reviewing unclassified technical reports published by Department of Energy national weapons laboratories.

PRC scientists have used their extensive laboratory-to-laboratory interactions with the United States to gain information from U.S. scientists on common problems, solutions to nuclear weapons physics, and solutions to engineering problems. The PRC uses elicitation in these meetings, where it shows familiarity with U.S. information in an effort to "prime the pump" in order to try to glean information about U.S. designs. U.S. scientists have passed information to the PRC in this way that is of benefit to the PRC's nuclear weapons program.

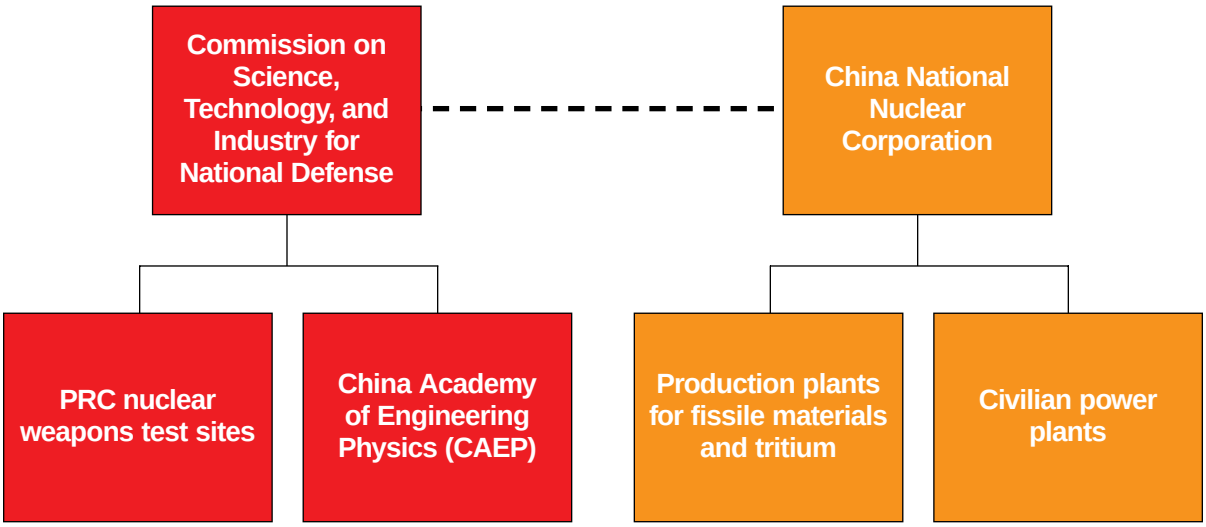
Specific examples of the loss of classified U.S. information in this manner are detailed in the Select Committee's classified Final Report. The Clinton administration has determined that these examples cannot be publicly discussed.

The PRC's espionage operations, which use traditional intelligence gathering organizations as well as other entities, are aggressively focused on U.S. weapons technology.

The PRC's Academy of Engineering Physics (CAEP), which is under the Commission of Science, Technology, and Industry for National Defense (COSTIND), is the entity in charge of the PRC's nuclear weapons program. It is responsible for the research and development, testing, and production of all of the PRC's nuclear weapons. The figure on the following page shows the organization of the PRC's nuclear infrastructure.[5]

The China Academy of Engineering Physics has pursued a very close relationship with U.S. national weapons laboratories, sending scientists as well as senior management to Los Alamos and Lawrence Livermore. Members of the China Academy of Engineering Physics senior management have made at least two trips during the mid-to-late 1990s to U.S. national weapons laboratories to acquire

Organization of the PRC's Nuclear Weapons Entities



The PRC's Academy of Engineering Physics (CAEP), which is under the Commission on Science, Technology, and Industry for National Defense, is responsible for the research and development, testing, and production of all of the PRC's nuclear weapons.

information and collect intelligence. These visits provide the opportunity for the PRC to collect intelligence. The presence of such PRC nationals at the U.S. national weapons laboratories facilitates the PRC's targeting of U.S. weapons scientists for the purpose of obtaining nuclear weapons information.

U.S. and PRC lab-to-lab exchanges were ended in the late 1980s, but were resumed in 1993. Scientific exchanges continue in many areas including high-energy physics.[6] Discussions at the U.S. national weapons laboratories in connection with the foreign visitors program are supposed to be strictly limited to technical arms control and material accounting issues. Nonetheless, these visits and scientific conferences provide opportunities for the PRC to interact with U.S. scientists outside of official meetings, and facilitate the PRC's targeting of U.S. weapons scientists.

The U.S. national weapons laboratories argue that there are reciprocal gains from the exchanges. The Department of Energy describes some of the insights gained from these exchanges as unique. On the other hand, PRC scientists have misled the U.S. about their objectives and technological developments. Despite considerable debate in Congress and the Executive branch, including several critical Government

Accounting Office reports, the U.S. Government has never made a definitive assessment of the risks versus the benefits of scientific exchanges and foreign visitor programs involving the U.S. national weapons laboratories.[7]

How the U.S. Government Learned of the PRC's Theft of Our Most Advanced Thermonuclear Warhead Design Information

The U.S. Government did not become fully aware of the magnitude of the counterintelligence problems at the Department of Energy laboratories until 1995. The first indication of successful PRC espionage against the laboratories arose in the late 1970s. During the last several years, more information has become available concerning thefts of U.S. thermonuclear warhead design information, and how the PRC may be exploiting it. A series of PRC nuclear tests conducted from 1992 to 1996 that furthered the PRC's development of advanced warheads led to suspicions in the U.S. intelligence community that the PRC had stolen advanced U.S. thermonuclear warhead design information.

The "Walk-In"

In 1995, a "walk-in" approached the Central Intelligence Agency outside of the PRC and provided an official PRC document classified "Secret" that contained design information on the W-88 Trident D-5 warhead, the most modern in the U.S. arsenal, as well as technical information concerning other thermonuclear warheads.

The CIA later determined that the "walk-in" was directed by the PRC intelligence services. Nonetheless, the CIA and other Intelligence Community analysts that reviewed the document concluded that it contained U.S. thermonuclear warhead design information.

The "walk-in" document recognized that the U.S. nuclear warheads represented the state-of-the-art against which PRC thermonuclear warheads should be measured.

Espionage Definition of a "Walk-In"

A "walk-in" is an individual who voluntarily offers to conduct espionage. *The Encyclopedia of Espionage* defines a "walk-in" as "an unheralded defector or a dangle, a 'walk-in' is a potential agent or a mole who literally walks into an embassy or intelligence agency without prior contact or recruitment." *See* the *Spy Book*, *The Encyclopedia of Espionage*, by Norman Polmar and Thomas B. Allen (RH Reference & Information Publishing, Random House).

The individual who approached the CIA in 1995 is suspected of being a "directed walk-in": a "walk-in" purposefully directed by the PRC to provide this information to the United States. There is speculation as to the PRC's motives for advertising to the United States the state of its nuclear weapons development.

Over the following months, an assessment of the information in the document was conducted by a multidisciplinary group from the U.S. Government, including the Department of Energy and scientists from the U.S. national weapons laboratories. The Department of Energy and FBI investigations focused on the loss of the U.S. W-88 Trident D-5 design information, but they did not focus on the loss of technical information about the other five U.S. thermonuclear warheads. A Department of Energy investigation of the loss of technical information about the other five U.S. thermonuclear warheads had not begun as of January 3, 1999, after the Select Committee had completed its investigation. Also, the FBI had not yet initiated an investigation as of January 3, 1999.

The PRC's Future Thermonuclear Warhead Requirements: The PRC's Need for Nuclear Test Data and High Performance Computers

Since signing the Comprehensive Test Ban Treaty (CTBT) in 1996, the PRC has faced new challenges in maintaining its modern thermonuclear warheads without physical testing. Indeed, even after signing the CTBT, the PRC may be testing sub-critical or low yield nuclear explosive devices underground at its Lop Nur test site.

The PRC likely does not need additional physical tests for its older thermonuclear warhead designs. But maintenance of the nuclear weapons stockpile for these weapons does require testing. The ban on physical testing to which the PRC agreed in 1996 has therefore increased the PRC's interest in high performance computing and access to sophisticated computer codes to simulate the explosion of nuclear weapons.[8]

The Select Committee judges that the PRC has likely developed only a very modest complement of codes from inputting its own testing data into high performance computers. The PRC would, therefore, be especially interested in acquiring U.S. thermonuclear weapons codes for any new weapons based on elements of stolen U.S. design information.

The Department of Energy reports that the PRC has in fact acquired some U.S. computer codes, including: the MCNPT code; the DOT3.5 code; and the NJOYC code.[9] MCNPT is a theoretical code that is useful in determining survivability of systems to electronic penetration and dose penetration in humans. DOT3.5 is a two-dimensional empirical code that performs the same kinds of calculations as MCNPT, except uses numerical integration. NJOYC acts as a numerical translator between DOT3.5 and MCNPT.

Given the limited number of nuclear tests that the PRC has conducted, the PRC likely needs additional empirical information about advanced thermonuclear weapon performance that it could obtain by stealing the U.S. "legacy" computer codes, such as those that were used by the Los Alamos National Laboratory to design the W-88 Trident D-5 warhead. The PRC may also need information about dynamic three-dimensional data on warhead packaging, primary and secondary coupling, and the chemical interactions of materials inside the warhead over time.

The Select Committee is concerned that no procedures are in place that would either prevent or detect the movement of classified information, including classified nuclear-weapons design information or computer codes, to unclassified sections of the computer systems at U.S. national weapons laboratories. The access granted to individuals from foreign countries, including students, to these unclassified areas of the U.S. national weapons laboratories' computer systems could make it possible for

others acting as agents of foreign countries to access such information, making detection of the persons responsible for the theft even more difficult.

The Select Committee believes that the PRC will continue to target its collection efforts not only on Los Alamos National Laboratory, but also on the other U.S. National Laboratories involved with the U.S. nuclear stockpile maintenance program.

The PRC may also seek to improve its hydrostatic testing capabilities by learning more about the Dual-Axis Radiographic Hydrotest (DARHT) facility at Los Alamos.

SYGMA

As a result of an espionage program going back to at least 1979, the PRC has stolen design information on the United States' most advanced thermonuclear warheads from America's National Laboratories like the one at Los Alamos, New Mexico *(above).* The PRC also rigorously reviews unclassified technical and academic publications, and uses extensive interaction with U.S. scientists at the National Labs. The Select Committee judges that the National Labs almost certainly remain penetrated today.

U.S. Government Investigations of Nuclear Weapons Design Information Losses

Investigation of Theft of Design Information for the Neutron Bomb

The Select Committee received information about the U.S. Government's investigation of the PRC's theft of classified U.S. design information for the W-70 thermonuclear warhead. The W-70, which is an enhanced radiation nuclear warhead (or "neutron bomb"), also has elements that can be used for a strategic thermonuclear warhead. In 1996 the U.S. Intelligence Community reported that the PRC had successfully stolen classified U.S. technology from a U.S. Nuclear Weapons Laboratory about the neutron bomb.

This was not the first time the PRC had stolen classified U.S. information about the neutron bomb. In the late 1970s, the PRC stole design information on the U.S. W-70 warhead from Lawrence Livermore Laboratory. The U.S. Government first learned of this theft several months after it took place. The PRC subsequently tested a neutron bomb in 1988.

The FBI developed a suspect in the earlier theft. The suspect worked at Lawrence Livermore National Laboratory, and had access to classified information including designs for a number of U.S. thermonuclear weapons in the U.S. stockpile at that time.

In addition to design information about the W-70, this suspect may have provided to the PRC additional classified information about other U.S. weapons that could have significantly accelerated the PRC's nuclear weapons program.

The Clinton administration has determined that further information about these thefts cannot be publicly disclosed.

Investigation of Thefts of Information Related to the Detection of Submarines and of Laser Testing of Miniature Nuclear Weapons Explosions

Peter Lee is a naturalized U.S. citizen who was born in Taiwan. Lee worked at Los Alamos National Laboratory from 1984 to 1991, and for TRW Inc., a contractor

to Lawrence Livermore National Laboratory, from 1973 to 1984 and again from 1991to 1997.[10]

Lee has admitted to the FBI that, in 1997, he passed to PRC weapons scientists classified research into the detection of enemy submarines under water. This research, if successfully completed, could enable the PLA to threaten previously invulnerable U.S. nuclear submarines.

Lee made the admissions in 1997 during six adversarial interviews with the FBI. According to Lee, the illegal transfer of this sensitive research occurred while he was employed by TRW, Inc., a contractor for the Lawrence Livermore National Laboratory. The classified U.S.information was developed by Lawrence Livermore as part of a joint United States-United Kingdom Radar Ocean Imaging project for anti-submarine warfare applications.

Specifically, on or about May 11, 1997, Lee gave a lecture in Beijing at the PRC Institute of Applied Physics and Computational Mathematics (IAPCM). Among the attendees were nuclear weapons scientists from the IAPCM and the China Academy of Engineering Physics (CAEP).

Lee described for the PRC weapons scientists the physics of microwave scattering from ocean waves. Lee specifically stated that the purpose of the research was anti-submarine warfare.

At one point in his presentation, Lee displayed an image of a surface ship wake, which he had brought with him from the United States. He also drew a graph and explained the underlying physics of his work and its applications. He told the PRC scientists where to filter data within the graph to enhance the ability to locate the ocean wake of a vessel.

Approximately two hours after his talk was over, Lee erased the graph and tore the ship wake image "to shreds" upon exiting the PRC institute.[11]

In 1997, the decision was made to not prosecute Lee for passing this classified information on submarine detection to the PRC. Because of the sensitivity of this area of research, the Defense Department requested that this information not be used in a prosecution.

Throughout much of the l990s, the FBI conducted a multi-year investigation of Peter Lee, employing a variety of techniques, but without success in collecting incriminating evidence. Finally, in 1997, Lee was charged with willfully providing to the PRC classified information on techniques for creating miniature nuclear fusion explosions.

Specifically, Lee explained to PRC weapons scientists how deuterium and tritium can be loaded into a spherical capsule called a target and surrounded by a "hohlraum," and then heated by means of laser bombardment. The heat causes the compression of these elements, creating a nuclear fusion micro-explosion. This so-called "inertial confinement" technique permits nuclear weapons scientists to study nuclear explosions in miniature — something of especial usefulness to the PRC, which has agreed to the ban on full-scale nuclear tests in the Comprehensive Test Ban Treaty.

Lee's admission that he provided the PRC with this classified information about nuclear testing using miniaturized fusion explosions came in the course of the same 1997 adversarial FBI interviews that yielded his admission of passing submarine detection research to the PRC. Lee's delivery of the miniature nuclear testing information to the PRC occurred in 1985, while he was employed as a researcher at Los Alamos National Laboratory.

Lee said that during a lecture in the PRC he answered questions and drew diagrams about hohlraum construction. In addition, Lee is believed to have provided the PRC with information about inertial confinement lasers that are used to replicate the coupling between the primary and secondary in a thermonuclear weapon.

Lee was formally charged with one count of "gathering, transmitting or losing defense information," in violation of Section 793 of Title 18 of the U.S. Code, and one count of providing false statements to a U.S. government agency, in violation of Section 1001, Title 18. On December 8, 1997, Lee pled guilty to willfully passing classified U.S. defense information to PRC scientists during his 1985 visit to the PRC. Lee also pled guilty to falsifying reports of contact with PRC nationals in 1997.

Lee was sentenced to 12 months in a halfway house, a $20,000 fine and 3,000 hours of community service.[12]

The Select Committee judges that, between 1985 and 1997, Lee may have pro-

vided the PRC with more classified thermonuclear weapons-related information than he has admitted.

The PRC apparently co-opted Lee by appealing to his ego, his ethnicity, and his sense of self-importance as a scientist.

Investigation of Theft of Design Information For the W-88 Trident D-5 Thermonuclear Warhead

The Select Committee received information about the U.S. Government's ongoing investigation of the loss of information about the W-88 Trident D-5 thermonuclear warhead design.

During the PRC's 1992 to 1996 series of advanced nuclear weapons tests, a debate began in the U.S. Government about whether the PRC had acquired classified U.S. thermonuclear weapons design information. The Department of Energy began to investigate. In 1995, following the CIA's receipt of evidence (provided by the PRC-directed "walk-in") that the PRC had acquired technical information on a number of U.S. thermonuclear warheads, including not only the W-88 Trident D-5 but five other warheads as well, the Department of Energy's investigation intensified. That investigation, however, focused on the W-88 and not the other weapons.

Early in its investigation, the Department of Energy cross-referenced personnel who had worked on the design of the W-88 with those who had traveled to the PRC or interacted with PRC scientists. One individual who had hosted PRC visitors in the past emerged from this inquiry as a suspect by the spring of 1995.

Even after being identified as a suspect, the individual, who still had a security clearance, continued to work in one of the most sensitive divisions at Los Alamos National Laboratory, Division X, which handles thermonuclear weapons designs and computer codes. In this position, the suspect requested and received permission to hire a PRC graduate student who was studying in the U.S. for the summer.

In December 1998, the suspect traveled to Taiwan. Following his return from Taiwan in December 1998, he was removed from Division X.

The FBI initiated a full investigation in the middle of 1996, which remains ongoing. At the date of the Select Committee's January 3, 1999 classified Final Report, the

suspect continues to work at the Los Alamos National Laboratory, and continues to have access to classified information.

The FBI investigation of this suspect's possible involvement in the theft of classified design information on the W-88 warhead and other matters is ongoing.

The Clinton administration has determined that further information on this matter cannot be disclosed publicly.

Investigation of Additional Incidents

The Select Committee reviewed one case that offers a troublesome example of the manner in which scientific exchanges in the PRC can be exploited for espionage purposes. The incident involved the inadvertent, bordering on negligent, disclosure of classified technical information by a U.S. scientist lecturing in the PRC.

The U.S. scientist, who was representing a U.S. National Laboratory during a lab-to-lab exchange with a PRC laboratory, was pressured by PRC counterparts to provide a solution to a nuclear weapons-related problem. Rather than decline, the scientist, who was aware of the clear distinction between the classified and unclassified technical information that was under discussion, provided an analogy. The scientist immediately saw that the PRC scientists had grasped the hint that was provided and realized that too much had been said.

The PRC employs various approaches to co-opt U.S. scientists to obtain classified information. These approaches include: appealing to common ethnic heritage; arranging visits to ancestral homes and relatives; paying for trips and travel in the PRC; flattering the guest's knowledge and intelligence; holding elaborate banquets to honor guests; and doggedly peppering U.S. scientists with technical questions by experts, sometimes after a banquet at which substantial amounts of alcohol have been consumed.

On average, the FBI has received about five security-related referrals each month from the Department of Energy. Not all of these concern the PRC. These referrals usually include possible security violations and the inadvertent disclosure of classified information.

The FBI normally conducts investigations of foreign individuals working at the National Laboratories.

The Clinton administration has determined that additional information in this section cannot be publicly disclosed.

The Department of Energy's Counterintelligence Program at the U.S. National Weapons Laboratories

With additional funds provided by Congress in 1998, the Department of Energy is attempting to reinvent its counterintelligence programs at the U.S. national weapons laboratories to prevent continued loss of information to the PRC's intelligence collection activities.

Funding for the Department of Energy's counterintelligence program, including seven employees at the Department of Energy's headquarters, was $7.6 million in Fiscal Year 1998. For Fiscal Year 1999, Congress has increased that amount to $15.6 million.

With the support of the Director of Central Intelligence and the Director of the Federal Bureau of Investigation, the President issued Presidential Decision Directive 61 (PDD-61) in February 1998. PDD-61 requires that a senior FBI counterintelligence agent be placed in charge of the Department of Energy's program, which has been done.

PDD-61 also instructed that a counterintelligence report with recommendations be presented to the Secretary of Energy. The report was submitted to the Secretary on July 1, 1998, with 33 specific recommendations. The Secretary had 30 days to respond to the National Security Council. However, due to the transition from Secretary Pena to Secretary Richardson, the response was delayed. In late November 1998, the Secretary of Energy approved all substantive recommendations. In December 1998, the Directors of the U.S. National Laboratories agreed to the counterintelligence plan during a meeting with the Secretary of Energy. The Department of Energy is now implementing the plan.

The Secretary's action plan instructs the Directors of the U.S. National Laboratories to implement the recommendations. It directs the Department of Energy's Office of Counterintelligence to fund counterintelligence positions at individual laboratories so that they work directly for the Department of Energy, not the contractors that administer the laboratories.

The Department of Energy will create an audit trail to track unclassified computer use and protect classified computer networks. The action plan also directs the creation of counterintelligence training programs and a counterintelligence analysis program.

The Department of Energy will also implement stricter requirements for reporting all interactions with foreign individuals from sensitive countries, including correspondence by e-mail. Laboratory Directors will be responsible for scrutinizing foreign visitors, in coordination with Department of Energy's Counterintelligence Office.

The Department of Energy will require counterintelligence polygraphs of those who work in special access programs (SAP) and sensitive areas with knowledge of nuclear weapons design, or actually have hands-on access to nuclear weapons (about 10 percent of the total cleared population within the Department of Energy). Such persons will also undergo financial reviews and more rigorous background investigations conducted through local field offices of the FBI.

The FBI reportedly has sent several agents to the Department of Energy in the last 10 years to try to improve the counterintelligence program, but has repeatedly been unsuccessful. A significant problem has been the lack of counterintelligence professionals, and a bureaucracy that "buried" them and left them without access to senior management or the Secretary of Energy. The Department of Energy's new Counterintelligence Director now has direct access to the Secretary.

After traveling to the laboratories and interviewing counterintelligence officials, the Department of Energy's new Counterintelligence Director reported in November 1998:

> *The counterintelligence program at DOE [the Department of Energy] does not even meet minimal standards ... there is not a counterintelligence [program], nor has there been one at DOE [the Department of Energy] for many, many years.*

The Department of Energy's counterintelligence program requires additional training, funding, and accountability, according to this counterintelligence official.

At present, the Department of Energy's background investigations are conducted by an Office of Personnel Management contractor. The new Director's opinion is that the present background investigations are "totally inadequate" and "do [not] do us any good whatsoever."

Another problem area is that the Department of Energy's counterintelligence process presently does not have any mechanism for identifying or reviewing the thousands of foreign visitors and workers at the U.S. national weapons laboratories. On one occasion reviewed by the Select Committee, for example, scientists from a U.S. National Laboratory met foreign counterparts in a Holiday Inn in Albuquerque, New Mexico, in order to circumvent their laboratory's security procedures.

One responsibility of the Department of Energy's new counterintelligence program will be to find out who visits the laboratories, including those from sensitive countries, what they work on while they visit, and whether their access is restricted to protect classified information. Mechanisms have been recommended to identify visitors and fully vet them. The Department of Energy will attempt to improve the database used for background checks.

Classified information has been placed on unclassified networks, with no system for either detection or reliable prevention. There are no intrusion detection devices to determine whether hackers have attacked the Department of Energy's computer network. According to damage assessments reviewed by the Select Committee, however, attacks on the computers at the U.S. national weapons laboratories are a serious problem. E-mail is also a threat: the U.S. national weapons laboratories cannot track who is communicating with whom. For example, over 250,000 unmonitored e-mails are sent out of the Sandia National Laboratory alone each week.

In the year 2000, the Department of Energy will concentrate on increasing its analytical and investigative capabilities. Until at least the year 2000, the Department of Energy's counterintelligence program will not be adequate.

The five U.S. National Laboratories (Lawrence Livermore, Los Alamos, Oak Ridge, Sandia, and Pacific Northwest) are the primary focus of the counterintelligence plan. The Department of Energy is hiring senior counterintelligence experts who will report directly to the Directors of these laboratories.

Many of the specific recommendations in the Presidential Decision Directive are not new, and similar changes have been attempted unsuccessfully before.

Notification of the President and Senior U.S. Officials

In response to interrogatories from the Select Committee, the National Security Advisor testified in writing that the President did not learn about the issue of successful PRC espionage at the U.S. national weapons laboratories and long-term counterintelligence problems at the Department of Energy until early 1998.[13]

The Department of Energy briefed the Secretary of Energy about the matter in late 1995 and early 1996.

The Department of Energy first briefed the Deputy National Security Advisor in April 1996.

The Department of Energy briefed the Director of Central Intelligence, the Director of the FBI, the Secretary of Defense, and the Attorney General during this period.

The Department of Energy has not briefed the Secretary of State or the Secretary of Commerce. The Congress was not fully briefed until late 1998, as a result of the efforts of the Select Committee.

Associated Press

Samuel (Sandy) R. Berger, National Security Advisor, originally told the Select Committee that he briefed President Clinton about the theft of U.S. nuclear information in early 1998. Later, in May 1999, as part of the declassification process to make this report publicly available, Berger advised the Select Committee that the President was briefed in July 1997, although no written record of this meeting exists.