



Nuclear Weapons R&D Organizations in Nine Nations

Jonathan Medalia, Coordinator
Specialist in Nuclear Weapons Policy

Shirley A. Kan
Specialist in Asian Security Affairs

Paul K. Kerr
Analyst in Nonproliferation

Carol Migdalovitz
Specialist in Middle Eastern Affairs

Derek E. Mix
Analyst in European Affairs

Mary Beth Nikitin
Analyst in Nonproliferation

Larry A. Nicksch
Specialist in Asian Affairs

March 16, 2009

Congressional Research Service

7-5700

www.crs.gov

R40439

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 16 MAR 2009		2. REPORT TYPE		3. DATES COVERED 00-00-2009 to 00-00-2009	
4. TITLE AND SUBTITLE Nuclear Weapons R&D Organizations in Nine Nations				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Congressional Research Service, Library of Congress, 101 Independence Ave SE, Washington, DC, 20540				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Summary

Seven nations—China, France, India, Pakistan, Russia, the United Kingdom, and the United States—possess nuclear weapons. In addition, North Korea tested a nuclear explosive device, and Israel is widely thought to have nuclear weapons. As an aid to Congress in understanding nuclear weapons, nuclear proliferation, and arms control matters, this report describes which agency is responsible for research and development (R&D) of nuclear weapons (i.e., nuclear explosive devices, as distinct from the bombers and missiles that deliver them) in these nations and whether these agencies are civilian or military. It also traces the history of such agencies in the United States from 1942 to the present. This report may be updated annually.

In the United States, the Army managed the nuclear weapons program during World War II. Since 1946, weapons R&D has been managed by civilian agencies, at present by the National Nuclear Security Administration, a semiautonomous agency in the Department of Energy.

China's nuclear weapons R&D is apparently under the direction of the military, collectively called the People's Liberation Army.

France's nuclear weapons R&D is supervised by the Ministry of Defense, which delegates the direction of these programs to the French Atomic Energy Commission (CEA). However, as with NNSA in the United States, CEA is not a part of the Ministry of Defense. CEA also conducts nuclear programs in science and industry, under the supervision of other ministries.

India's nuclear weapons R&D appears to be controlled by the Department of Atomic Energy, which is under the direct control of the Prime Minister.

Israel's nuclear program is under civilian control, but since Israel neither confirms nor denies that it possesses nuclear weapons, it classifies information on nuclear weapons, including organizations responsible for R&D. The Israel Atomic Energy Commission reportedly has overall responsibility for Israel's nuclear weapons program, and the Director General of that commission reports directly to the prime minister.

North Korea's Ministry of Atomic Energy Industry is in charge of the day-to-day operation of the nuclear weapons program. Under it are nuclear-related organizations. Policy is decided by leader Kim Jong-il and other Communist Party and military leaders who advise him.

Pakistan's National Command Authority (NCA) supervises the functions and administration of all of Pakistan's "Strategic Organizations," which are composed of all organizations involved in nuclear weapons. The President is the chair of the NCA, the Prime Minister is vice chair, and the membership includes senior civilian and military leaders.

Russia's State Atomic Energy Corporation (Rosatom) is responsible for nuclear weapons R&D and production. It is a civilian agency, though it has many links to the military.

In the United Kingdom, a private company, AWE Management Limited, manages and operates the Atomic Weapons Establishment (AWE), a government-owned, contractor-operated entity. The Ministry of Defence (MoD), which is headed by a civilian, controls the operations, policy, and direction of AWE and can veto actions of the company. The MoD provides most of the funding for AWE.

Contents

Introduction	1
United States.....	1
China	3
France	3
India.....	5
Israel	5
North Korea.....	6
Pakistan	7
Russia	7
United Kingdom.....	8

Contacts

Author Contact Information	10
----------------------------------	----

Introduction

Since 1945, seven nations—China, France, India, Pakistan, Russia, the United Kingdom, and the United States—have developed and currently deploy nuclear weapons. In addition, North Korea tested a low-yield nuclear explosive device in 2006, and Israel is generally thought to possess nuclear weapons, although it maintains a policy of ambiguity on this matter.¹ This report describes the organizations controlling research and development (R&D) on nuclear weapons (i.e., nuclear explosive devices, as distinct from the bombers and missiles that carry them) in these nations, and presents a brief history of the organizations controlling nuclear weapons R&D in the United States. It discusses whether these organizations are civilian or military, though in many nations the lines between civilian and military are blurred. This information may be of use to Members of Congress and their staff interested in nuclear weapons, nuclear proliferation, and arms control matters.

United States

The U.S. program for research, development, and production of nuclear weapons began during World War II. It was initially under the control of the Office of Scientific Research and Development, a civilian agency within the Executive Office of the President. In 1942, control shifted to the Army, in substantial part because the Army had the capability to manage projects to design and build the massive plants to produce uranium and plutonium for atomic bombs.² In 1945 and 1946, debate raged in Congress, the White House, the War Department, and among scientists and the public about whether to place atomic energy under civilian or military control.³ Congress resolved the issue in favor of civilian control of atomic energy in the Atomic Energy Act of 1946 (P.L. 79-585).⁴ That act created the Atomic Energy Commission (AEC) to develop nuclear weapons and, more generally, to foster and control research into atomic energy. The AEC was an independent organization, separate from the War Department and, later, from the Department of Defense (DOD). Ever since, nuclear weapons R&D has been conducted by the AEC and its successor organizations, all of which have been under civilian control and separate from DOD.⁵

The Atomic Energy Act of 1954 (P.L. 83-703), as amended, replaces the Atomic Energy Act of 1946.⁶ The Nuclear Regulatory Commission states that the 1954 act “is the fundamental U.S. law on both the civilian and the military uses of nuclear materials.”⁷

¹ For additional information on nuclear weapon programs of various nations, see CRS Report RL30699, *Nuclear, Biological, and Chemical Weapons and Missiles: Status and Trends*, by Paul K. Kerr.

² Richard Hewlett and Oscar Anderson, Jr., *The New World, 1939/1946, Volume I: A History of the United States Atomic Energy Commission* (University Park, PA: The Pennsylvania State University Press, 1962), pp. 71-83.

³ *Ibid.*, pp. 7, 408-411.

⁴ “Atomic Energy Act of 1946 (Public Law 585, 79th Congress), Excerpted from ‘Legislative History of the Atomic Energy Act of 1946 (Public Law 585, 79th Congress),’” Compiled by James D. Nuse, AEC Headquarters Library, Volume 1, Principal Documents, U.S. Atomic Energy Commission, Washington, 1965, <http://www.osti.gov/atomicenergyact.pdf>.

⁵ For a detailed timeline of the history of DOE and its predecessor agencies, see “Energy Timeline” at the DOE website at <http://www.energy.gov/about/timeline.htm>.

⁶ The Act, as amended, is available at (continued...)

The Energy Research Reorganization Act of 1974 (P.L. 93-438) abolished the AEC. It established the Nuclear Regulatory Commission, which regulated civilian uses of nuclear energy; the Energy Research and Development Administration (ERDA), which was in charge of nuclear weapons, among other things; and the Energy Resources Council. In 1977, the Department of Energy Organization Act (P.L. 95-91) abolished ERDA and the Federal Energy Administration and established DOE.

In 1999, Title XXXII of P.L. 106-65, National Defense Authorization Act for FY2000, established the National Nuclear Security Administration (NNSA) as a semiautonomous agency within DOE. That act stated, regarding the semiautonomous status:

SEC. 3213. STATUS OF ADMINISTRATION AND CONTRACTOR PERSONNEL WITHIN DEPARTMENT OF ENERGY.

(a) Status of Administration Personnel.—Each officer or employee of the Administration, in carrying out any function of the Administration—

(1) shall be responsible to and subject to the authority, direction, and control of—

(A) the Secretary acting through the Administrator and consistent with section 202(c)(3) of the Department of Energy Organization Act;

(B) the Administrator; or

(C) the Administrator's designee within the Administration; and

(2) shall not be responsible to, or subject to the authority, direction, or control of, any other officer, employee, or agent of the Department of Energy.

Section 3203 states that the Secretary of Energy “shall be responsible for establishing policy” for NNSA, while Section 3251 requires that NNSA’s budget shall be treated separately in the DOE budget.

NNSA’s Office of Defense Programs is responsible for such nuclear weapons work as R&D, production, transportation between DOE sites and between DOE and DOD sites, maintenance of weapons (except for minor maintenance at DOD sites), and dismantlement and disposition. NNSA’s other major program areas are Defense Nuclear Nonproliferation and Naval Reactors. The Nuclear Weapons Council coordinates NNSA and DOD work on nuclear weapons. The council was established pursuant to P.L. 99-661, FY1987 National Defense Authorization Act, Section 3137.⁸ According to DOD, the members of the council are the Under Secretary of Defense for Acquisition, Technology, and Logistics, the Vice Chairman of the Joint Chiefs of Staff, the Under Secretary for Nuclear Security of the Department of Energy (who is also the

(...continued)

http://www4.law.cornell.edu/uscode/uscode42/usc_sup_01_42_10_23_15_A.html.

⁷ U.S. Nuclear Regulatory Commission, “Our Governing Legislation,” <http://www.nrc.gov/about-nrc/governing-laws.html#aea-1954>.

⁸ See 10 U.S.C. 179, at http://www4.law.cornell.edu/uscode/10/usc_sec_10_00000179---000-.html.

Administrator of NNSA), and the Under Secretary of Defense for Policy; there are also 10 nonvoting observers.⁹

At present, NNSA's nuclear weapons activities are conducted at eight sites: Los Alamos National Laboratory (NM), Lawrence Livermore National Laboratory (CA), and Sandia National Laboratories (NM and CA), all of which conduct weapons R&D; Pantex Plant (TX), Kansas City Plant (MO), and Y-12 Plant (TN), all of which are involved in the production, maintenance, and dismantlement of nuclear weapons; and the Savannah River Site (SC), which processes tritium, a key ingredient of nuclear weapons, and the Nevada Test Site (NV). While the last U.S. nuclear test was conducted in September 1992, the latter site conducts weapons-related experiments not involving nuclear explosions and remains available to conduct nuclear tests if needed. A DOE website contains summary and detailed DOE budget requests for FY2002-FY2009.¹⁰ (Written by Jonathan Medalia, Specialist in Nuclear Weapons Policy.)

China

The research, development, testing, and production of nuclear weapons in the People's Republic of China (PRC) appear to be under the direction of the military, which is collectively called the People's Liberation Army (PLA). The work is conducted by the China Academy of Engineering Physics (CAEP), which is a large organization that encompasses many institutes. It is believed that CAEP reports to the PLA's General Armaments Department (GAD), which was established in 1998. The PLA, through the GAD, also controls the nuclear weapon test site in the northwestern Xinjiang region. At the same time, the PRC's defense industrial policy has integrated military and civilian efforts, including work at military and civilian universities. The China National Nuclear Corporation (CNNC) is a defense industrial state-owned conglomerate that plays a role in nuclear weapons development, civilian nuclear power plants, and other related nuclear facilities. CNNC is 1 of 11 defense industrial conglomerates under the Ministry of Industry and Informatization (MII), a "super ministry" created in 2008. The MII seems to fall under the State Council (similar to a Cabinet) and the Central Military Commission (the Communist Party of China's command of the PLA).¹¹ (Written by Shirley Kan, Specialist in Asian Security Affairs.)

France

France's nuclear weapons R&D is supervised by the Ministry of Defense, which delegates the direction of these programs to the French Atomic Energy Commission (CEA). According to the CEA website, "The CEA is the French Atomic Energy Commission (Commissariat à l'énergie

⁹ U.S. Department of Defense. Office of the Deputy Assistant to the Secretary of Defense for Nuclear Matters. "Nuclear Weapons Council," updated March 2, 2009, <http://www.acq.osd.mil/ncbdp/nm/nuclearweaponscouncil.html>.

¹⁰ U.S. Department of Energy. Office of the Chief Financial Officer, *Office of the Chief Financial Officer Products and Services*, <http://www.mbe.doe.gov/crorg/prodCR.cfm>.

¹¹ This section is based on review of numerous resources, including Tai Ming Cheung, *Fortifying China* (Cornell University Press, 2009); Thomas Reed and Danny Stillman, "The Nuclear Express," *Wall Street Journal*, January 16, 2009; Thomas Reed, "The Chinese Nuclear Tests, 1964-1996," *Physics Today*, September 2008; PRC and Hong Kong media articles; CAEP's information; and Nuclear Threat Initiative database (<http://www.nti.org>).

atomique). It is a public body established in October 1945 by General de Gaulle.”¹² CEA states that it “is active in three main fields: Energy, information and health technologies, and defense and national security.”¹³ For an organization chart, see the footnoted link.¹⁴

The Embassy of France provided the material in the balance of this section.¹⁵

CEA is a public entity with scientific, technical and industrial missions. It is independent in terms of administration and finances. Its general programs are defined by a Comité à l’Energie Atomique, which is chaired by the Prime Minister. The CEA Chairman is in charge of managing this entity, a sort of Chief Executive Director. He is also chairing the CEA Board. He is appointed by the Government and is a permanent member of the Comité à l’Energie Atomique. The High Commissioner is in charge of advising the CEA Chairman, concerning the scientific and technical issues. He is appointed by the Government and is usually a Member of the above “Comité,” with a right to submit specific matters. He is chairing the CEA Scientific Committee.

Further,

The CEA activities relative to military applications are carried out in a specific direction [directorate] of CEA, named “Direction for Military Applications” (DAM). Its activities are supervised by the Ministry of Defense, but the direction of the programs is for a large part delegated to CEA. A Commission, called Comité Mixte Armées-CEA, is controlling their execution, particularly on the financial questions. As it is the case for NNSA, CEA and DAM, as any other Direction of CEA, are not a part of the Ministry of Defense, neither of any other Ministry.

Regarding the budget,

CEA is an independent public entity, which is supervised both by:

- the Ministry of Ecology, Energy, Sustainable Development and Town and Country Planning,
- the Ministry for Higher Education and Research,
- the Ministry of Defense

which means that they have a common view on CEA strategies, but each Ministry brings the budget corresponding to its programs.

(Compiled by Jonathan Medalia, Specialist in Nuclear Weapons Policy.)

¹² Commissariat à l’énergie atomique, “Facts and Figures,” http://www.cea.fr/english_portal/cea/identity.

¹³ Ibid.

¹⁴ Commissariat à l’énergie atomique, “Organization Chart,” http://www.cea.fr/english_portal/cea/identity/organization_chart.

¹⁵ Emails from Embassy of France, February 9, 10, and 27, 2009.

India

The organizations concerned with research and development for India's nuclear weapons all appear to be controlled by the Department of Atomic Energy (DAE), which was set up in 1954 under the direct charge of the Prime Minister.¹⁶ The Department continues to function under the direct control of the Prime Minister.¹⁷ According to publicly available information from the DAE, the Department includes facilities widely believed by experts to be part of (or potentially part of) India's nuclear weapons program, including nuclear reactors, reprocessing facilities, and enrichment facilities.¹⁸ All of these facilities appear to be under the control of the Bhabha Atomic Research Centre and the Indira Gandhi Centre for Atomic Research, both of which are part of the DAE. (Written by Paul Kerr, Analyst in Nonproliferation.)

Israel

Israel follows a policy of strategic ambiguity or nuclear opacity regarding its nuclear weapons program, neither confirming nor denying its existence.¹⁹ Its officials simply state that Israel would not be the first to introduce nuclear weapons into the region, without explaining what that means. Israel believes that this policy enhances its deterrence. Therefore, the Office of the Military Censor does not permit reporting on the country's nuclear infrastructure, facilities, and organizations. Nonetheless, there have been many reports alleging and concerning Israel's nuclear weapons program.²⁰ Indeed, as far back as 1974 a U.S. Special National Intelligence Estimate stated, "We believe that Israel already has produced and stockpiled a small number of fission weapons."²¹

Israel's nuclear program is under civilian control. In 1952, the Israel Atomic Energy Commission (IAEC) was created to advise the government on nuclear policy and on nuclear research and development priorities, and to implement policies. In 1957, then Director General of the Ministry

¹⁶ Statement from the Atomic Energy Commission. Available at <http://www.aec.gov.in/>.

¹⁷ Statement from the Bhabha Atomic Research Centre. Available at <http://www.barc.ernet.in/webpages/about/>.

¹⁸ Information about organizations under control of the DAE is available at http://www.barc.gov.in/dae_units.html. For more information about India's civilian and military nuclear facilities, see CRS Report RL33292, *India's Nuclear Separation Plan: Issues and Views*, by Sharon Squassoni.

¹⁹ A consensus among media and expert reports is that Israel possesses a nuclear arsenal of 100 to 200 weapons, although some suggest a higher figure. See Nuclear Threat Initiative, "Israel Nuclear Facilities," http://www.nti.org/e_research/profiles/Israel/nuclear/3583.html, and Douglas Frantz, "Israel Gains Full Nuclear Arsenal," *Los Angeles Times*, October 12, 2003, among others. National Public Radio reporter Eric Weiner used the range of 200 to 400 nuclear weapons, citing the CIA as his source, in a report on All Things Considered, March 22, 2001.

²⁰ The most notable revelations may have been those of Mordechai Vanunu, a former technician at Israel's nuclear reactor complex, who provided data on and photographs of the nuclear reactor center at Dimona to the *Sunday Times* (London) in 1986. Vanunu reported that Israel had been building nuclear weapons for 20 years and possessed a stockpile of between 100 and 200 warheads. In 1988, Israel convicted Vanunu of espionage and treason for selling secrets to the *Times*, but did not admit that his disclosures were truthful. Several books rely on Vanunu's information, including Yair Evron, *Israel's Nuclear Dilemma*, Ithaca: Cornell University Press, 1994, and Seymour Hersh, *Samson Option*, New York, Vintage Books, 1993. Other sources include Avner Cohen, *Israel and the Bomb* (New York: Columbia University Press, 1998), p. 1, and "Completing the Deterrence Triangle," *Carnegie Endowment for International Peace, Non-Proliferation Project*, v. 3, no. 18, June 29, 2000.

²¹ U.S. Director of Central Intelligence, *Special National Intelligence Estimate: Prospects for Further Proliferation of Nuclear Weapons*, SNIE 4-1-74, 1974, p. 20.

of Defense Shimon Peres sidelined the IAEC during the development of the nuclear center at Dimona and gave the responsibility for developing the center to the Armament Development Authority in the Ministry of Defense. As are all other aspects of the IAEC's operations, its relations with the military are classified. The IAEC was restructured after Peres resigned in 1966, when it reportedly assumed overall responsibility for Israel's nuclear weapons program.²² The Director General of the IAEC reports directly to the prime minister, a civilian who is officially Chairman of the Commission.²³ In August 2007, Prime Minister Ehud Olmert named Dr. Shaul Horev (alternate transliteration: Chorev), formerly deputy chief of the Israeli navy and then head of a secret "special means unit" within the Defense Ministry, to be the new Director General of the IAEC.

The IAEC directs research at the Center for Nuclear Research at Nahal Sorek (alternative transliteration: Soreq) south of Tel Aviv and at the larger Center for Nuclear Research in the Negev south of Dimona. According to journalists, the Ministry of Defense provides most of the operating funds for the research centers. The Ministry of Defense is headed by a civilian minister, who is often, but not always, a retired general. The Sorek center reportedly conducts nuclear weapons research and design. Dimona is the site of the nuclear reactor and fissile material processing plant, and reportedly both highly enriched uranium and plutonium are produced there.²⁴ (Written by Carol Migdalovitz, Specialist in Middle Eastern Affairs.)

North Korea²⁵

Policy-making toward North Korea's nuclear program has been vested in the National Defense Council since 1991. North Korean leader, Kim Jong-il heads this body. The other members represent the North Korean Workers (Communist) Party and the North Korean military. Kim Jong-il has had the supreme decision-making authority on nuclear policy since he succeeded his father, Kim Il-sung in 1994. However, in August 2008, he suffered a severe stroke. Since then, a collective decision-making apparatus has emerged, apparently headed by his brother-in-law, Chang song-taek. It contains key North Korean military commanders, and the military has been more influential in the policy-making context since Kim's stroke. While U.S. and South Korean intelligence officials have stated that Kim Jong-il appears to have partially recovered from the stroke, most experts believe the new collective apparatus will continue to have an important policy-making role in the future.

At the top of the operational organization is North Korea's Ministry of Atomic Energy Industry, a full-fledged cabinet ministry. Under this ministry, there are a number of nuclear-related organizations and research centers. There are two committees: an Isotope Application Committee and a Nuclear Energy Committee. The Ministry also directs a nuclear research center at Yongbyon, the site of North Korea's known plutonium facilities. There also is a nuclear energy institute in Pyongyang, the capital.

²² Federation of American Scientists, <http://www.fas.org/nuke/guide/israel/agency/iaec.htm>.

²³ A prime minister has been known to delegate responsibility for the IAEC to another minister in order to make a cabinet portfolio more attractive for coalition-building.

²⁴ Nuclear Threat Initiative, "Israel Nuclear Facilities."

²⁵ This section is based largely on *North Korea's Weapons of Mass Destruction: Problems and Prospects*, edited by Kim Kyong-soon, Hollym Publishers, 2004. See also CRS Report RL34256, *North Korea's Nuclear Weapons*, by Mary Beth Nikitin.

The Yongbyon nuclear research center consists of 10 branches: (1) Uranium Resources Development Institute; (2) Nuclear Physics Institute; (3) Radiochemical Laboratory (plutonium reprocessing); (4) Nuclear Material Institute; (5) Nuclear Energy Research Institute; (6) Isotope Utilization Institute; (7) Neutron Physics Institute; (8) Reactor Design Institute; (9) Nuclear Electromagnetics Institute; (10) Radiation Protection Institute.

Under this organization framework, there are more than a dozen major nuclear facilities. The main ones at Yongbyon are a 5-megawatt nuclear reactor, a plutonium reprocessing plant, and a fuel fabrication plant. There also are at least five uranium mining and milling facilities. It also is believed that North Korea has facilities for storing its stockpile of plutonium, which it has produced at Yongbyon, and for storing a few nuclear weapons that it may have produced. (Written by Larry Niksch, Specialist in Asian Affairs.)

Pakistan

The National Command Authority (NCA) supervises the functions and administration of all of Pakistan's organizations involved in nuclear weapons research, development, and employment, as well as the military services that operate the strategic forces.²⁶ The President is Chairperson of the NCA; the Prime Minister is the Vice-Chairperson. Other members of the NCA include senior military and civilian officials.²⁷ The NCA, as Pakistan's main decision-making body for nuclear weapons issues, is made up of two committees. One, the Development Control Committee (DCC), includes several military officials; its Deputy Chairperson is also the Chair of the Joint Chiefs of Staff. The DCC "exercises technical, financial and administrative control over all strategic organisations, including national laboratories and research and development organisations associated with the development and modernisation of nuclear weapons."²⁸ The second is the Employment Control Committee. A Strategic Plans Division (SPD) acts as the secretariat for the NCA.²⁹ The SPD is tasked with the daily management of Pakistan's strategic assets and has oversight over the "Strategic Organizations," which include Pakistan Atomic Energy Commission and Dr. A.Q. Khan Research Laboratories; it oversees "the systematic progress of weapon systems."³⁰ (Written by Paul Kerr, Analyst in Nonproliferation.)

Russia

The Russian Federation has continued the Soviet pattern of civilian government control of the nuclear infrastructure, including military and civilian programs. The Soviet Union's nuclear weapons program began in the late phases of World War II and developed into 10 closed "nuclear

²⁶ December 2007 Ordinance To Provide For The Constitution And Establishment Of National Command Authority.

²⁷ Ibid.

²⁸ *Nuclear Black Markets: Pakistan, A.Q. Khan and the Rise of Proliferation Networks*, (London: The International Institute of Strategic Studies), 2007. p. 111; Pakistan Announcement of Nuclear-Weapons Command-and-Control Mechanism, *Associated Press of Pakistan*, February 3, 2000. *Nuclear Black Markets*, pp. 110-111, has organization charts of the NCA and SPD.

²⁹ The SPD is headed by a Director General from the Army.

³⁰ *Nuclear Black Markets*, p. 111.

cities.” The Soviet nuclear complex was under the Soviet Ministry of Atomic Power and Industry, which in 1992 became the Ministry for Atomic Energy (MinAtom). The Russian Federation inherited the vast majority of the Soviet Union’s nuclear assets. After government restructuring in 2004, MinAtom became the Federal Agency for Atomic Energy (FAAE, known as Rosatom). After being appointed head of the agency, former Prime Minister Sergei Kiriyenko led a restructuring of the nuclear complex to facilitate an expansion of nuclear power exports and international collaboration. The primary objective, mandated by the 2007 “Tunnel Law,” was to consolidate all civilian nuclear assets under a new joint stock company, Atomenergoprom, under Rosatom. A further restructuring converted Rosatom itself from a federal agency to a government-owned corporation, the Rosatom State Atomic Energy Corporation (which retained nearly all its functions as a government agency). Kiriyenko, who stayed in his post as head of the organization, is directly accountable to the President. Rosatom manages Atomenergoprom and is directly responsible for defense-related nuclear work, nuclear science, the back end of the fuel cycle, and nuclear safety and security matters.

Rosatom’s Nuclear Weapons Complex branch is responsible for developing, testing, producing, and dismantling all nuclear weapons. The Nuclear Weapons Complex branch consists of two divisions: the Nuclear Weapons Production Division and the Development and Testing Division. The latter oversees the two major Russian nuclear weapon design research institutes—the All-Russian Scientific Research Institute for Experimental Physics in Sarov (VNIIEF) and the All-Russian Scientific Research Institute for Technical Physics in Snezhinsk (VNIITF), founded in 1946 and 1955, respectively. A number of research centers also participate in nuclear weapons work. Rosatom also maintains a test site at Novaya Zemlya. The Ministry of Defense oversees the storage and deployment of nuclear weapons.³¹ (Written by Mary Beth Nikitin, Analyst in Nonproliferation.)

United Kingdom

The Atomic Weapons Establishment (AWE) is responsible for the design, production, assembly, and maintenance of the UK’s nuclear weapons, as well as decommissioning and disassembly.³² The British government owns all AWE sites and assets, which are based at two facilities in Berkshire: Aldermaston and Burghfield. Government control of AWE is exercised by the civilian-led Ministry of Defence (MoD) and vested in its top official, the Secretary of State for Defence.³³ Since creation of this post in 1964, this official has always been a civilian, a Member of Parliament, and a member of the Prime Minister’s cabinet. Within the MoD structure, the

³¹ Unclassified Nuclear Proliferation Assessment Statement Pursuant to Section 123 a. of the Atomic Energy Act of 1954, as Amended, With Respect to the Proposed Agreement Between the Government of the United States of America and the Government of the Russian Federation For Cooperation in the Field of Peaceful Uses of Nuclear Energy, May 1, 2008; NIS Nuclear and Missile Database, Nuclear Threat Initiative website, <http://www.nti.org>; and Rosatom State Corporation website, <http://www.minatom.ru/>.

³² AWE’s mission also covers nuclear threat reduction, including threat assessment, response to defense-related nuclear incidents, and verification (for example, monitoring Comprehensive Test Ban Treaty compliance and conducting research into future multilateral arms control regimes). See AWE website, http://www.awe.co.uk/set/national_nuclear_security.aspx.

³³ Nuclear Information Service, *Hansard on Control of Atomic Weapons Establishment - 26th Jan 09*, <http://www.nuclearinfo.org/view/nuclear+sites/AWE+Aldermaston/a1983>.

Minister of State for Defence Equipment and Support (DE&S), also a civilian and a Member of Parliament, has specific lead responsibility for government policy and direction regarding AWE.³⁴

In 1993, AWE was made a government-owned, contractor-operated entity, and its management was contracted to the private consortium Hunting-BRAE.³⁵ In 2000, the MoD awarded a new ten-year contract to AWE Management Limited (AWE ML), a partnership of Lockheed Martin, Serco, and British Nuclear Fuels Limited. This contract has since been extended through 2025. With the management contract, AWE ML took over the operating company AWE plc, which handles day-to-day operations and employs the workforce of around 4,500 staff and 2,000 contractors. The MoD retains a “golden share”—a nominal share allowing it to veto corporate action—in AWE plc.³⁶ In December 2008, Jacobs Engineering Group Inc. acquired British Nuclear Fuels Limited’s share of AWE ML.³⁷ AWE ML is contractually obligated to consult with the government regarding all such changes in the composition of its ownership.³⁸

The great majority of funding for AWE comes from the UK defense budget, primarily under allocations for the DE&S section of the MoD.³⁹ The Directorate Strategic Weapons of DE&S manages the AWE contract, leading MoD monitoring and liaison with AWE ML to ensure the execution of government decisions regarding Britain’s strategic requirements.⁴⁰ AWE facilities are subject to the same regime of licensing and safety regulations as civil nuclear plants, and are regularly inspected for compliance by the Nuclear Installations Inspectorate, a division of the Nuclear Directorate of the UK Health and Safety Executive.⁴¹ (Written by Derek Mix, Analyst in European Affairs.)

³⁴ UK Ministry of Defence website, http://www.cabinetoffice.gov.uk/ministerial_responsibilities/departments/mod.aspx#ministers5.

³⁵ UK Ministry of Defence, *The United Kingdom's Defence Nuclear Weapons Programme*, <http://www.mod.uk/NR/rdonlyres/B31B4EF0-A584-4CC6-9B14-B5E89E6848F8/0/plutoniumandaldermaston.pdf>.

³⁶ AWE website, http://www.awe.co.uk/aboutus/the_company_eb1b2.aspx.

³⁷ “Britain sells stake in nuclear warhead factory,” *Agence France-Presse*, December 20, 2008.

³⁸ Nuclear Information Service, op. cit.

³⁹ A small percentage of AWE’s funding is understood to come from other government departments, with this money allocated mainly for its threat reduction mission.

⁴⁰ Nuclear Information Service, op. cit.

⁴¹ See Henrietta Wilson, “Renewing Trident: Can the UK’s Atomic Weapons Establishment Cope?,” *Disarmament Diplomacy*, no. 88 (Summer 2008).

Author Contact Information

Jonathan Medalia, Coordinator
Specialist in Nuclear Weapons Policy
jmedalia@crs.loc.gov, 7-7632

Shirley A. Kan
Specialist in Asian Security Affairs
skan@crs.loc.gov, 7-7606

Paul K. Kerr
Analyst in Nonproliferation
pkerr@crs.loc.gov, 7-8693

Carol Migdalovitz
Specialist in Middle Eastern Affairs
cmigdalovitz@crs.loc.gov, 7-2667

Derek E. Mix
Analyst in European Affairs
dmix@crs.loc.gov, 7-9116

Mary Beth Nikitin
Analyst in Nonproliferation
mnikitin@crs.loc.gov, 7-7745

Larry A. Niksch
Specialist in Asian Affairs
lniksch@crs.loc.gov, 7-7680