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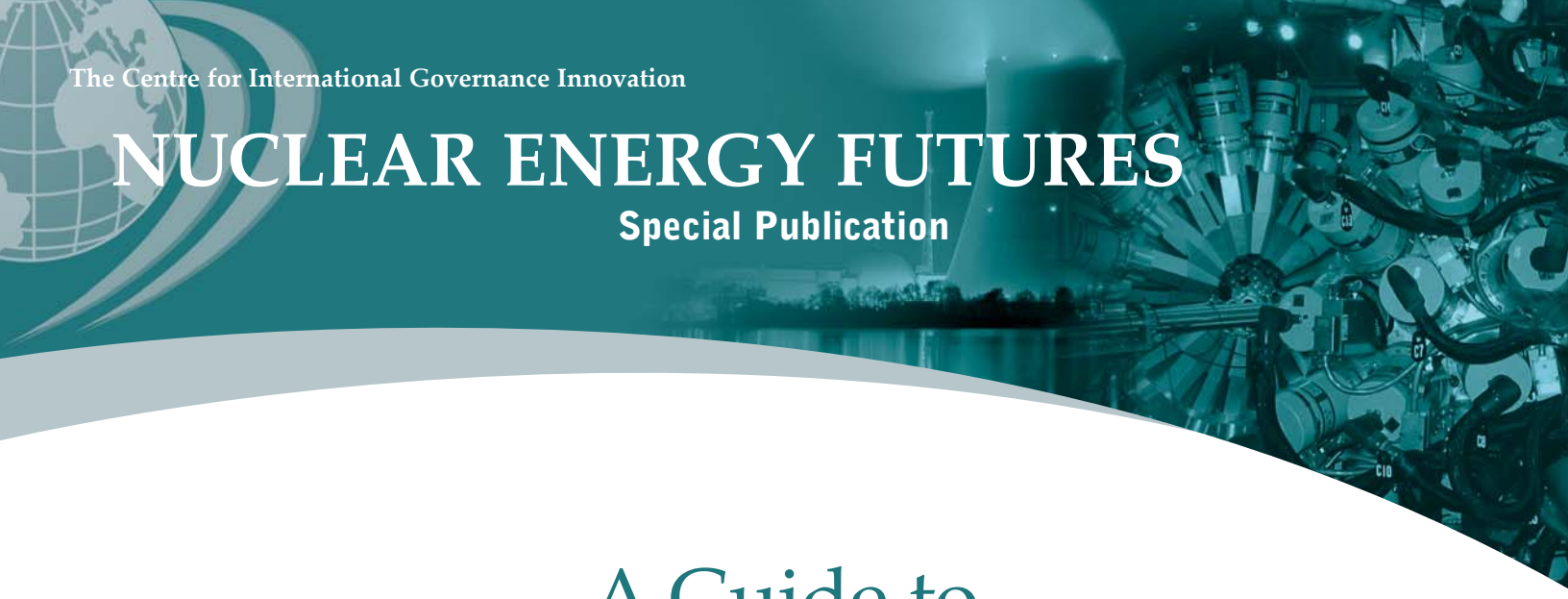

NUCLEAR ENERGY FUTURES

Special Publication

A Guide to Global Nuclear Governance: Safety, Security and Nonproliferation

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Author Biography

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Canadian Centre for Treaty Compliance

CIGI's Nuclear Energy Futures Project is being conducted in partnership with the Centre for Treaty Compliance at the Norman Paterson School of International Affairs, Carleton University, Ottawa.

Letter from the Executive Director

On behalf of The Centre for International Governance Innovation (CIGI), it is my pleasure to introduce the Nuclear Energy Futures Papers Series. CIGI is a Canadian-based non-partisan think tank that addresses international governance challenges and provides informed advice to decision makers on multilateral governance issues. CIGI supports research initiatives by recognized experts and promising academics; forms networks that link world-class minds across disciplines; informs and shapes dialogue among scholars, opinion leaders, key policy makers and the concerned public; and builds capacity by supporting excellence in policy-related scholarship.

CIGI's Nuclear Energy Futures Project is chaired by CIGI Distinguished Fellow Louise Fréchette and directed by CIGI Senior Fellow Trevor Findlay, Director of the Canadian Centre for Treaty Compliance at the Norman Paterson School of International Affairs, Carleton University, Ottawa. The project is researching the scope of the purported nuclear energy revival around the globe over the coming two decades and its implications for nuclear safety, security and nonproliferation. A major report to be published in 2009 will advance recommendations for strengthening global governance in the nuclear field for consideration by Canada and the international community. This series of papers presents research commissioned by the project from experts in nuclear energy or nuclear global governance. The resulting research will be used as intellectual ballast for the project report.

We encourage your analysis and commentary and welcome your thoughts. Please visit us online at www.cigionline.org to learn more about the Nuclear Energy Futures Project and CIGI's other research programs.

John English
Executive Director

Introduction

This is a comprehensive guide to the international treaties, organizations, initiatives and networks that together form the global regime dealing with nuclear nonproliferation, safety and security. Each entry includes a brief description, pertinent dates and, where relevant, the numbers of participating states.

Nonproliferation refers to preventing the spread of nuclear weapons and their component parts and materials and relevant technologies to state or non-state actors. Nuclear safety refers to the prevention and mitigation of nuclear accidents and the harmful effects of radiation on human health and the environment. Nuclear security refers to the physical protection of nuclear materials and equipment from theft or tampering.

The nonproliferation side of global nuclear governance includes a number of legally-binding treaties, as well as a monitoring, verification and compliance system – known as nuclear safeguards – that is implemented and managed by the International Atomic Energy Agency (IAEA), the primary global nuclear governance institution. Nearly all states have committed themselves to the nonproliferation regime. Only Israel, India and Pakistan remain largely outside of it, being the only states not to have become parties to the 1970 Nuclear Non-Proliferation Treaty, the cornerstone of the regime. Even these three states are, however, members of the IAEA and are subject to some safeguards with respect to some nuclear facilities and materials.

Unlike the nonproliferation regime, the nuclear safety and security regime, although based on legally-binding treaties, is mainly voluntary in respect to detailed implementation. States are not obligated to adhere to the provisions of the numerous guides and codes of conduct established by the IAEA and other institutions. Mandatory monitoring, verification and compliance are practically non-existent. As a result, global governance in respect of safety and security is more diffuse than the nonproliferation regime and includes a broader range of institutions dedicated to specific aspects of safety and security.

This guide was compiled for the *Nuclear Futures Project*, a partnership between CIGI and the Canadian Centre for Treaty Compliance (CCTC) at the Norman Paterson School of International Affairs (NPSIA), Carleton University. The information contained in this guide was adapted from official websites.

Nuclear Nonproliferation

This is a guide to the main international treaties, organizations, initiatives and networks dealing with issues of nuclear nonproliferation.

Multilateral Treaties

1963 Partial Test Ban Treaty (PTBT)

The PTBT, also known as the Limited Test Ban Treaty (LTBT), entered into force on October 10, 1963, and as of March 24, 2008 had 131 states parties. The treaty bans nuclear testing in the atmosphere, outer space and underwater.

1967 Outer Space Treaty

The Outer Space Treaty entered into force on October 10, 1967, and as of March 24, 2008 had 98 states parties and 27 signatories. Article IV of the treaty specifically addresses nuclear weapons, prohibiting states parties from deploying nuclear weapons in Earth's orbit, on celestial bodies or in outer space.

1968 Nuclear Non-Proliferation Treaty (NPT)

The NPT entered into force on March 5, 1970, and as of March 24, 2008 only Israel, India and Pakistan are not parties to it. The NPT commits states to not attempt to acquire, or aid other states in acquiring, nuclear weapons for any purpose. It also guarantees the right of all states to peaceful nuclear technology, and commits the five designated nuclear weapon states (NWS) to pursue in good faith nuclear disarmament. The NPT was extended indefinitely in 1995.

1971 Seabed Treaty

The Seabed Treaty entered into force on May 18, 1972, and as of March 24, 2008 had 87 states parties. The treaty bans states from employing nuclear weapons and other weapons of mass destruction on the ocean floor beyond a 12-mile coastal zone.

Nuclear Weapon-Free Zones (NWFZ)

All of the nuclear weapon-free zones ban the testing, use, manufacture, production or acquisition of nuclear weapons in the region, as well as direct or indirect support for their receipt, storage, installation, deployment or any form of possession.

- **1959 Antarctic Treaty** – The treaty entered into force on June 23, 1961 and as of March 26, 2008 had 44 states parties and 31 consultative parties. It establishes Antarctica as a non-militarized zone, including a ban on the deployment of nuclear weapons to the region.
- **1967 Treaty of Tlatelolco** – The treaty entered into force on April 25, 1969, and as of March 26, 2008 had 33 states parties, comprising all of Latin America and the Caribbean. All five NWS have signed Additional Protocol II, committing them not to use or threaten to use nuclear weapons in the region.
- **1985 Treaty of Rarotonga** – The treaty entered into force on December 11, 1986, and as of March 26, 2008 had 13 states parties. It establishes an NWFZ in the South Pacific. All five NWS have signed Additional Protocol II, committing them not to use or threaten to use nuclear weapons in the region.
- **1995 Treaty of Bangkok** – The treaty entered into force on March 28 1997, and as of March 26, 2008 had 10 states parties. It establishes a NWFZ in Southeast Asia. The five NWS have not yet signed any protocols because of objections by the US and France regarding security assurances and definitions of territory.
- **1996 Treaty of Pelindaba** – The treaty will enter into force upon its 28th ratification, and as of March 26, 2008 had 53 signatories, 11 of which had ratified it. It will establish an NWFZ in Africa and the surrounding islands.
- **2006 Central Asian Nuclear Weapon-Free Zone** – The treaty will enter into force upon its 5th ratification. It establishes an NWFZ in Central Asia. As of March 26, 2008 Kyrgyzstan and Uzbekistan have ratified, and Kazakhstan, Tajikistan and Turkmenistan have signed it. The treaty faces strong opposition from the US, UK and France because of Kazakhstan, Kyrgyzstan and Tajikistan's security arrangements with Russia that may permit nuclear weapons.

1996 Comprehensive Nuclear Test Ban Treaty (CTBT)

The CTBT will enter into force once all 44 Annex 2 states ratify it, 35 of which had done so as of March 26, 2008, in addition to 109 other states. It bans the testing of or participation in the testing of all nuclear devices.

2005 Convention on the Prevention of Nuclear Terrorism

The convention entered into force on July 7, 2007, and as of March 26, 2008 had 28 states parties and 115 signatories. It criminalizes acts intending to cause harm with radioactive material in international law, requiring states to implement national legislation making such acts criminal offences. It further requires that all states prevent and counter preparations made within their national boundaries to cause harm with radioactive material.

International Atomic Energy Agency

International Atomic Energy Agency (IAEA)

The IAEA was established in 1957 as the primary international body responsible for promoting safe, secure and peaceful use of nuclear technologies. The 1968 Nuclear Non-Proliferation Treaty designated the IAEA as the international body responsible for the oversight and implementation of safeguards to prevent nuclear proliferation. The following statements of principle and agreements are the basis for the agency's nonproliferation efforts.

The Agency's Safeguards System (INFCIRC/66/Rev.2)

The latest version of the IAEA's safeguards system was approved in 1965, and provisionally extended in 1966 and 1968. It lays out the general principles and procedures for IAEA safeguards to ensure that states do not use their peaceful nuclear facilities for the acquisition of nuclear weapons. The IAEA undertakes this task by a combination of design reviews, facility and nuclear material record-keeping, state reporting to the IAEA and inspections.

Nuclear Safeguards (INFCIRC/153/Corrected)

INFCIRC/153 outlines how safeguards agreements between the IAEA and states parties to the NPT are designed and implemented as required under Article III of the treaty. It makes explicit the IAEA's right and obligation to ensure that safeguards are applied. It lays the foundation for mutual cooperation between states and the IAEA, including the IAEA's responsibility to avoid hampering the economic and technological development of a state and to protect state secrets. The document lays out processes for establishing national systems of accounting and control of nuclear material, provision of information to the IAEA and agency inspections.

- **Small Quantities Protocol** – Article 36 of INFCIRC/153 makes an exemption for states with small quantities of nuclear material. The required reporting by the state is kept to a minimum and the IAEA generally does not carry out inspections if the state concludes a small quantities protocol. The protocol does not exempt states from the implementation of safeguards on relevant nuclear material and facilities, nor does it exempt them from reporting on all imports and exports of nuclear material.

Additional Protocol (INFCIRC/540/Corr.1)

The IAEA drafted a model additional protocol to existing safeguards agreements between NPT states and the IAEA in September 1997. The additional protocol expands the scope of existing safeguards agreements. Its objective is to improve the IAEA's ability to detect clandestine nuclear activities. States are required to provide cradle to grave information about their nuclear facilities to the IAEA. The protocol also allows the IAEA to conduct more intrusive inspections. States are not obligated to conclude an additional protocol, though there is typically strong international pressure to do so.

Voluntary Safeguards between Nuclear Weapon States and the IAEA

The five NWS are not obligated under the NPT to conclude safeguards agreements with the IAEA. However, all five NWS have voluntarily agreed to limited safeguards on certain facilities and material. The safeguards are intended as a confidence-building measure between the NWS and the non-nuclear weapon states (NNWS).

Safeguards Evaluation and Review

IAEA Standing Advisory Group on Safeguards Implementation (SAGSI)

The Standing Advisory Group on Safeguards Implementation was established in 1975 and is comprised of a group of safeguards experts from IAEA member states. Its functions are to provide an external perspective on safeguards to the IAEA secretariat, a means of communicating the views of governments and industry on safeguards and a channel for explaining the rationale for safeguards developments.

IAEA International SSAC Advisory Service (ISSAS)

The International State System for Accounting and Control Advisory Service was established to provide member states of the IAEA with an advisory service for establishing effective national accounting and control systems pertaining to their nuclear facilities and materials. Upon the request of a member state, ISSAS conducts an evaluation of the state's nuclear fuel cycle activities and makes recommendations to increase the effectiveness and efficiency of safeguards.

European Safeguards Research and Development Association (ESARDA)

ESARDA's members are Europe's major nuclear energy companies. Its objective is to assist them with the efficient and effective implementation of IAEA safeguards.

Bilateral Agreements

Bilateral Safeguards Agreements

Many suppliers of nuclear equipment and materials require their buyers to complete a bilateral safeguards agreement to permit verification that the items in question are being used for peaceful purposes. Such verification may be additional to that imposed by the IAEA safeguards agreement.

Bilateral Nuclear Cooperation Agreements

Many nuclear suppliers make extensive arrangements with states to supply and assist in the development of peaceful nuclear programs. The level of cooperation ranges from supplying equipment and expertise to building nuclear facilities ready for operation. Such agreements may contain nonproliferation clauses.

Other Organizations

European Commission

The European Commission is the executive body that oversees the European Atomic Energy Community (Euratom). Euratom was one of the three communities established by the 1958 Treaty of Rome, originally with its own commission. The 1967 Merger Treaty amalgamated the commissions established by the Treaty of Rome into the European Commission. Euratom's nonproliferation efforts include nuclear material accounting and export controls of nuclear material.

- **European Nuclear Energy Forum** – The forum was established in 2007 so that European leaders can openly debate the challenges expected from the expansion of nuclear energy in Europe. A part of the forum's mandate is to find ways to strengthen nonproliferation efforts.

Brazilian-Argentine Agency for Accounting of Nuclear Materials (ABACC)

The agency was established by Brazil and Argentina in 1991. It is responsible for verifying that the nuclear materials in both countries are being used for strictly peaceful purposes.

Informal Arrangements[1]

NPT Exporters Committee (Zangger Committee)

The Zangger Committee began meeting in 1971 and as of April 2, 2008 had 36 members, including the five NWS. Its objective is to reach agreement on an accurate interpretation of what material and equipment is included in article 3, paragraph 2 of the NPT. The paragraph requires that all nuclear material and equipment exported to another state be under IAEA safeguards. The broader aim of the committee is to prevent the diversion of exported peaceful nuclear material and equipment to weapon programs.

Nuclear Suppliers Group (NSG)

The NSG was established in 1975 and as of April 2, 2008 had 45 members. The group seeks to contribute to the nonproliferation of nuclear weapons through the implementation of guidelines for nuclear exports and nuclear related exports. The group has produced extensive export guidelines on nuclear transfers that establish extensive controls on all nuclear related exports. These controls have been endorsed by the IAEA document INFCIRC/254.

2003 Proliferation Security Initiative (PSI)

PSI was announced by the US government on May 31, 2003. The initiative is a coalition of 11 states dedicated to stopping the shipments of weapons of mass destruction, their delivery systems and related materials. The initiative emphasizes interdiction as a means to combat proliferation.

G-8 Non-Proliferation Experts Group (G-8 NPEG)

The G-8 NPEG includes the G8 nations and is dedicated to combating the proliferation of weapons of mass destruction. The group addresses a wide range of nonproliferation issues with a particular emphasis on preventing terrorists from acquiring weapons of mass destruction (WMD) or their delivery systems. It is a forum for the world's major powers to agree on principles and initiatives that seek to reduce proliferation threats.

UN Security Council

UNSC Resolution 1540 (2004)

Resolution 1540 was adopted by the Security Council on April 28, 2004 to commit states to take steps to prevent the proliferation of WMD, including nuclear and radiological weapons. It requires that states work to prevent non-state actors from acquiring these weapons, put into effect national legislation outlawing non-state actors from seeking to acquire them and take effective measures to prevent their proliferation.

US Initiatives

2004 Global Threat Reduction Initiative (GTRI)

GTRI was announced by the US on May 26, 2004. Its broad objective is to minimize the amount of fissile material available globally that can be used for a nuclear weapon. It aims to do so by securing, removing, relocating and disposing of this material and related equipment as quickly as possible. The initiative is primarily focused on a global cleanout of HEU used in research reactors in order to reduce the risk of theft by non-state actors. The US intends to work with the IAEA and other partners, particularly Russia and the former Soviet states, to achieve its objective.

2006 Global Nuclear Energy Partnership (GNEP)

GNEP was announced by the US on February 6, 2006. It is a US government-led international initiative aimed at encouraging the expansion of domestic and international nuclear energy production while working toward the reduction of proliferation and environmental risks. Its membership includes over 38 countries, including many of the world's leading nuclear energy producers.

US-Russia Initiatives

Cooperative Threat Reduction (CTR)

The United States, Russia, and the former Soviet states have cooperated on a number of initiatives to reduce and secure stockpiles of materials and equipment in the former Soviet territory. The following initiatives are directly related to nuclear nonproliferation.

- **Fissile Material Storage Facility (FMSF)** – The FMSF was completed on December 11, 2003 in cooperation between the US and Russia. The facility is intended to provide a centralized, safe, secure and ecologically sound storage facility for weapons grade fissile material. The facility contributes to nonproliferation by securing weapons grade material.

[1] Nuclear trade is outside the scope of the General Agreement on Tariffs and Trade (GATT) as well as the World Trade Organization (WTO). Any trade disputes are resolved through regional institutions and networks or bilateral arrangements.

- **Weapons of Mass Destruction Proliferation Prevention Initiative (WMD-PPI)** – The Proliferation Prevention Initiative is an agreement between the US and the former Soviet states, excluding Russia. The program aims to address the potential vulnerability of the borders of the former Soviet states to the smuggling of WMD and related components. The US is assisting the former Soviet states in improving their border security to prevent proliferation.

1993 US-Russia HEU Purchase Agreement

Under the HEU Purchase agreement Russia takes high enriched uranium removed from its nuclear warheads and downgrades it to low enriched uranium that is then sold to the United States Enrichment Corporation (USEC). USEC resells the LEU to US companies that use it in their commercial nuclear reactors. The aim of the program is to provide a financial incentive for the reduction of Russian stockpiles of HEU that can be used in a nuclear device.

2000 US-Russia Plutonium Management and Disposition Agreement

The Plutonium Management and Disposition Agreement was reached on June 4, 2000 between the US and Russia. It commits both parties to dispose of at least 34 tonnes of weapons grade plutonium based on agreed minimum yearly rates of disposition beginning in 2007. Most of the plutonium is expected to be disposed of by burning it as fuel. The agreement is designed to eliminate weapons grade plutonium that is in excess of both states' national security needs.

2006 US-Russia Global Initiative to Combat Nuclear Terrorism

The initiative was launched by the US and Russia on July 15, 2006. Several other states have since agreed on the program's statement of principles and terms of reference for implementation and assessment. The program draws on existing conventions and resolutions in its statement of principles, confirming the importance of various measures to prevent the theft of nuclear material and to combat terrorism.

Nuclear Safety and Security

This is a guide to the main international treaties, organizations, initiatives and networks dealing with issues of nuclear safety and security.

Multilateral Treaties and Conventions[2]

1963 Vienna Convention on the Civil Liability for Nuclear Damage

The convention entered into force on November 12, 1977 with the IAEA as the depositary, and as of February 25, 2008 had 35 states parties and 14 signatories. It makes nuclear operators liable for any damage caused by their facilities and provides for compensation for those affected by nuclear damage. States parties negotiated a protocol in September 1997 that provides a broader scope, increases the amount of liability of nuclear operators, and enhances means for securing adequate compensation. The protocol entered into force on October 4, 2003, and as of June 27, 2008 had 5 states parties and 15 signatories.

1971 Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material

The convention entered into force on July 15, 1975 with the International Maritime Organization (IMO) as the depositary, and as of July 30, 2008 had 16 states parties. It is an addition specific to the transport of nuclear material by sea to the 1963 Vienna Convention. It limits the liability of nuclear operators that transport nuclear material to protect them from overwhelming financial burdens in the event of an accident.

1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (London Convention)

The London Convention entered into force on August 30, 1975 with the International Maritime Organization (IMO) as depositary, and as of June 27, 2008 had 84 states parties. It prohibits the dumping of hazardous materials, including nuclear, at sea. States parties strengthened the convention several times through numerous amendments, including a 1993 amendment to ban the dumping of low-level radioactive wastes. The amendment came into force on February 20, 1994.

1980 Convention on Physical Protection of Nuclear Materials (CPPNM)

The CPPNM entered into force on February 8, 1987 with the IAEA as depositary, and as of February 25, 2008 had 130 states parties and 45 signatories. The convention

[2] Conventions dealing with issues related to nuclear propulsion for peaceful uses fall outside the parameters of the Nuclear Futures Project. As a result, the 1962 Convention on the Liability of Operators of Nuclear Ships is not included in this guide.

establishes measures related to the prevention, detection and punishment of offenses relating to plutonium, uranium-235, uranium-233 and irradiated fuel, excluding those used for military purposes. It requires that states parties establish protection measures to secure nuclear material and criminalize actions involving its misuse.

1986 Convention on Early Notification of a Nuclear Accident

The convention entered into force on September 26, 1986 with the IAEA as the depositary, and as of February 25, 2008 had 101 states parties and 70 signatories. It establishes a notification system for nuclear accidents that have the potential for transboundary release and that have radiological safety significance for other states.

1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

The convention entered into force on September 26, 1986 with the IAEA as the depositary, and as of February 25, 2008 had 99 states parties and 68 signatories. It sets out a framework for states to provide assistance in the case of nuclear accidents in the form of available experts, equipment and other material, with the IAEA acting as the focal point for cooperation.

1994 Convention on Nuclear Safety

The convention entered into force on October 24, 2006 with the IAEA as the depositary, and as of February 25, 2008 had 61 states parties and 65 signatories. It aims to legally commit states that maintain land-based nuclear power plants to a high level of safety by setting international benchmarks. The convention is intended to create incentives for states parties, so negotiating parties did not include compliance mechanisms or punitive measures designed to obligate states parties to adhere to its provisions.

1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

The convention entered into force on June 18, 2001 with the IAEA as the depositary, and as of February 25, 2008 had 46 states parties and 42 signatories. It aims to protect individuals, societies and the environment from the potential hazards of radioactive waste through the enhancement of national measures as well as international cooperation. The convention applies to civilian nuclear programs, as well as declared spent fuel and radioactive waste from military programs.

1997 Convention on Supplementary Compensation for Nuclear Damage

The convention will not enter into force until at least five states with a minimum of 400,000 installed units of nuclear capacity have ratified it. As of June 27, 2008, the convention had 4 states parties and 13 signatories, with the IAEA as depositary. It defines additional amounts that states parties must contribute to public funds in the case of nuclear incidents. The convention calls for contributions based on installed nuclear capacity and the UN rate of assessment for contributions to international organizations.

2005 Convention on the Prevention of Nuclear Terrorism

The convention entered into force on July 7, 2007, and as of March 26, 2008 had 28 states parties and 115 signatories. It criminalizes in international law acts intended to cause harm with radioactive material and requires states to implement national legislation making such acts criminal offences. It further requires that all states prevent and counter activities within their national boundaries intended to cause harm with radioactive material.

The IAEA and Subsidiary Bodies

International Atomic Energy Agency (IAEA)

The International Atomic Energy Agency was established in 1957 as the primary international body responsible for promoting safe, secure and non-military nuclear technologies. The 1968 Nuclear Non-Proliferation Treaty designated the IAEA as the international body responsible for the implementation of safeguards to prevent nuclear proliferation. The IAEA's safeguards role is considered its major activity, but it also has an important role in promoting nuclear safety and security. The following codes of conduct are the starting point for its safety and security efforts.

- **1990 Code of Practice on the International Transboundary Movement of Radioactive Waste (INFCIRC/386)** – The IAEA adopted this code on September 21, 1990. It encourages states to take appropriate measures to ensure that radioactive waste under its control is safely managed and disposed of to ensure protection of human health and the environment. It encourages the safe international transboundary movement of radioactive waste through a variety of recommendations, and reaffirms states' right to prohibit the movement of waste through its territory.
- **2001 Code of Conduct on the Safety and Security of Radioactive Sources (revised 2003)** – This code establishes norms for maintaining the safety and security of

radioactive sources, defined as radioactive material that has been encapsulated or that has leaked from a storage container. Recommendations include establishing effective legislation and regulation of radioactive sources, as well as import and export controls. The code of conduct is supported by 92 states that have submitted formal notifications to the IAEA, including all of the world's current nuclear energy states.

- **2004 Code of Conduct on the Safety of Research Reactors** – The objective of this code is to achieve and maintain a high safety standard for research reactors. It encourages the enhancement of national measures and international cooperation including safety related technical cooperation. It does not apply to military research reactors, or to issues of physical security of nuclear material.

Commission on Safety Standards (CSS)

The CSS is a standing body of senior government officials holding national responsibility for establishing standards for nuclear radiation, waste safety and transport. The commission provides guidance to the IAEA to ensure coherence and consistency between standards. One of the primary objectives of the commission is to promote the worldwide application of IAEA safety standards. The CSS oversees the following four specialist committees:

- **Nuclear Safety Standards Committee (NUSSC)** – The NUSSC advises and reviews the IAEA on safety standards pertaining to nuclear power plants, research reactors and fuel cycle activities. Its objective is to achieve consensus, quality, coherence and consistency in the development of international standards for nuclear safety.
- **Radiation Safety Standards Committee (RASSC)** – The RASSC advises and reviews the IAEA on safety standards pertaining to radiation safety. Its objective is to achieve consensus, quality, coherence and consistency in the development of international standards for radiation safety.
- **Transport Safety Standards Committee (TRANSSC)** – The TRANSSC advises and reviews the IAEA on safety standards pertaining to the safety of transport of radioactive material. Its objective is to achieve consensus, quality, coherence and consistency in the development of international standards for transport safety.
- **Waste Safety Standards Committee (WASSC)** – The WASSC advises and reviews the IAEA on safety standards pertaining to radioactive waste management, waste treatment and safety of disposal facilities. Its objective is to achieve consensus, quality, coherence and consistency in the development of international standards for radioactive waste safety.

Other IAEA Initiatives

Guidelines

Since its establishment the IAEA has published numerous safety fundamentals, requirements and guides for states with nuclear technology. These standards address a wide range of nuclear-related activities, including nuclear power plant design and operation, waste disposal, decommissioning and the establishment of national legislation and infrastructure. Lists, descriptions and texts of these various standards are available at the IAEA's website.

- **1998 Guidelines for the Management of Plutonium (INFCIRC/549)** – The Guidelines for the Management of Plutonium describes measures to encourage the responsible handling, physical protection, accountancy and control, international transfer, national policy implementation and transparency of states' plutonium holdings. The guidelines are recommendations made by certain member states derived from their national policies. Several member states routinely submit up-to-date figures of their plutonium holdings and estimated amounts of plutonium contained in spent civil reactor fuel.
- **2006 IAEA Fundamental Safety Principles (No. SF-1)** – The IAEA established these safety standards to protect health and minimize the danger to life and property from nuclear activities. They were published in 2006 as a comprehensive guide for states to ensure a high level of safety in the use of nuclear materials and radioactive sources. While not binding on member states, adherence to these standards is strongly encouraged, and they are jointly sponsored by several other international bodies concerned with nuclear safety, such as the Nuclear Energy Agency of the OECD and EURATOM. They are the principle source of safety guidelines for states in their nuclear activities.

Evaluation and Review

The IAEA established the following bodies for the purpose of assisting member states in the evaluation and review of their nuclear activities:

- **International Nuclear Safety Group (INSAG)** – This group is comprised of experts with high-level professional competence in nuclear safety. It provides authoritative advice on nuclear safety approaches, policies and principles. It is particularly important in providing recommendations and opinions on current and emerging nuclear safety issues to the IAEA, the nuclear industry and the public.

- **Integrated Regulatory Review Service (IRRS)** – This peer review service aims to provide advice and assistance to member states to enhance the effectiveness of their regulatory infrastructure. The IRRS uses a self-assessment approach, with the IAEA providing an independent review at the request of the member state. Its objective is to encourage member states to take the initiative in reviewing and enhancing their regulatory infrastructure.
- **Safety Evaluation During Operation of Fuel Cycle Facilities (SEDO)** – This review service is intended to assist member states in enhancing the safety of their fuel cycle facilities, at their request. It is a peer review process that bases its performance evaluation on IAEA safety standards and the expertise of its team. Its objective is to promote the continuous development of operational safety and the dissemination of information on good safety practices.

The International Nuclear Event Scale (INES)

The scale was established in 1989 by the IAEA to communicate to the public the severity of events reported at nuclear installations. Its main function is to provide the media and public with a risk assessment of nuclear events based on a seven-level scale, ranging from an 'anomaly' to a 'major accident'.

Other Multilateral Organizations

United Nations Scientific Committee of the Effects of Atomic Radiation (UNSCEAR)

UNSCEAR was established by the UN General Assembly in 1955 to assess and report levels and effects of exposure to ionizing radiation. Its scientific estimates have provided the basis for many states' evaluations of radiation risk and their establishment of protective measures. It is strictly a scientific body that provides an authoritative source of information on the sources and effects of ionizing radiation.

Nuclear Energy Agency of the Organization for Economic Cooperation and Development in Europe (OECD/NEA)

The Nuclear Energy Agency assists member countries in maintaining and developing the scientific, technological and legal basis required for the management of nuclear energy. Its membership includes 28 countries in Europe, North America and the Asia-Pacific region. The NEA works as a forum for cooperation and the sharing of expertise between member states.

- **1960 Convention on Third Party Liability in the Field of Nuclear Energy (amended 1964 and 1982)** – This convention came into force on July 29, 1960. It is an agreement between European states with nuclear energy programs that establishes basic rules for liability for nuclear damage within Europe.
- **Committee on the Safety of Nuclear Installations (CSNI)** – This committee was created to assist member countries in developing and maintaining the capacity to assess the safety of nuclear reactors and fuel cycle activities. It is primarily a forum for the exchange of technical information and for collaboration between organizations.
- **Committee on Nuclear Regulatory Activities (CNRA)** – This committee is comprised of senior regulators in the nuclear industry. Its objective is to guide the NEA's program concerning the regulation, licensing and inspection of nuclear installations with regard to safety.
- **Radioactive Waste Management Committee (RWMC)** – This committee fosters international cooperation on problems related to the management of radioactive waste and radioactive materials among OECD members. It is primarily a forum for the exchange of information and experience on waste management policies and practices.
- **Working Party on Decommissioning and Dismantling (WPDD)** – This working party was created to assist member countries with the decommissioning and dismantling of their nuclear facilities. It focuses on promoting cooperation and transparency in decommissioning and dismantling efforts.
- **Committee on Radiation Protection and Public Health (CRPPH)** – This committee was created to identify emerging radiation issues, analyze their potential implications and make recommendations to further enhance radiation protection, regulation and implementation among NEA member countries.

International Commission on Radiological Protection (ICRP)

The ICRP was founded in 1928 to provide recommendations to states concerning the establishment of appropriate radiation protection measures, initially in the medical area. It is a scientific body with its own journal, the *Annals of the ICRP.* The commission includes five committees working on radiation effects, doses from radiation exposure, protection in medicine, the application of ICRP recommendations and protection of the environment.

International Labour Organization (ILO)

The International Labour Organization is devoted to ensuring conditions of freedom, equity, security and human dignity in labour. Safety standards are a part of the organization's objectives. The following three conventions are relevant to the nuclear industry.

- **Radiation Protection Convention No. 115** – This convention was adopted on June 22, 1960 with the aim of protecting workers from ionizing radiation. The convention places restrictions on the exposure of workers to ionizing radiation. It commits employers to restricting worker exposure to the lowest practicable levels, avoiding any unnecessary exposure.
- **Occupational Cancer Convention No. 139** – This convention was adopted on June 24, 1974 with the aim of protecting workers from the hazards caused by carcinogenic substances and agents. Radiation falls under the scope of this convention.
- **Working Environment Convention No. 148** – This convention was adopted on June 22, 1977 with the aim of protecting workers against occupational hazards resulting from air pollution, noise and vibration. Its scope includes the provisions outlined in the Radiation Protection Convention and Occupational Cancer Recommendation.

Institute of Nuclear Materials Management (INMM)

The Institute of Nuclear Materials Management was established in 1958 to advance practices for and to encourage further research into nuclear materials management. It does so by establishing best practices and disseminating information through meetings, reports, publications and other media.

World Institute for Nuclear Security (WINS)

The World Institute for Nuclear Security is expected to be launched by the Nuclear Threat Initiative (NTI) and Institute of Nuclear Materials Management in cooperation with the IAEA in 2008. It will be dedicated to improving the security of nuclear materials globally by facilitating information exchange and establishing best practices.

Networks

G8 Nuclear Safety and Security Group (G8-NSSG)

The NSSG was created to provide technically informed, strategic policy advice to leaders of the G8 on issues that affect safety and security in the peaceful use of nuclear energy. The main purpose of the group is to promote existing safety standards and best practices and to further cooperation among the G8 and other states in nuclear safety and security. It works in close cooperation with existing multilateral organizations and is intended not to duplicate work already being done by them.

International Nuclear Regulators Association (INRA)

The International Nuclear Regulators Association was created in 1997 as a forum for the world's senior nuclear regulators to exchange views on technical, legal, economic and administrative issues related to nuclear power. The organization's primary objective is to facilitate international cooperation among regulators to strengthen nuclear safety regulation.

Networks Concerning Certain Types of Nuclear Programs and Equipment

These networks are comprised of groups of states with an interest in certain types of nuclear technology.

- **Network of Regulators of Countries with Small Nuclear Programmes (NERS)** – NERS is a network of states and inspectors dedicated to the free exchange of nuclear information. It is designed to aid states with problems that are unique to their relatively small nuclear programs. It aims to facilitate information exchange and to share regulatory insights between its members.
- **CANDU[3] Senior Regulators** – The CANDU Senior Regulators is a group of states that operate CANDU-type nuclear power plants. The network produces an annual report addressing some of the technical challenges specific to CANDU type reactors and methods of resolving them, including those related to safety.
- **Cooperation Forum of State Nuclear Safety Authorities of Countries which operate WWER[4] Reactors** – The WWER forum was created to allow operators of WWER reactors to cooperate and exchange information on the effective operation of their nuclear facilities. The safety of WWER reactors is among the forum's concerns.

Regional Networks

These networks are specific to certain regions and address nuclear safety and security.

- **Asian Nuclear Safety Network (ANSN)** – The objective of the ANSN is to pool and share technical knowledge and practical experience to further improve the safety of nuclear installations in Asia. It is an electronic database of nuclear safety knowledge that its members, the IAEA, and other states contribute to. The database is only available to member countries and is not open to the public.
- **Western European Nuclear Regulators Association (WENRA)** – The main objective of WENRA is to develop

[3] Canada deuterium uranium (CANDU)
[4] Water-water energetic reactor (WWER)

a common approach to nuclear safety among nuclear safety regulators in Europe. Its membership consists of senior staff members of nuclear regulatory authorities of European countries. The association encourages states to cooperate in the application of IAEA safety standards, since their implementation is typically done independently at the national level.

- **Ibero-American Nuclear and Radiation Safety Network** – The Ibero-American network was created to facilitate cooperation in the development of peaceful nuclear technology among states in South and Central America. The network's primary aim is to allow its members to enhance and improve nuclear and radiological safety in their respective countries.

Research and Training

World Nuclear University (WNU)

The WNU is a global partnership dedicated to enhancing international leadership and education in the peaceful applications of nuclear science and technology. It works through global nuclear industry organizations (WNA, WANO), intergovernmental nuclear agencies (IAEA, NEA) and institutions of nuclear learning in 30 countries. Nuclear safety is one item on the university's agenda.

International Nuclear Safety Center (INSC)

The centre is a branch of the US Department of Energy. Its objective is to improve nuclear power reactor safety worldwide by promoting the open exchange of nuclear safety information and by developing enhanced nuclear safety technology. It is currently focused on Soviet designed plants in Russia and Eastern Europe.

Industry Institutions

World Association of Nuclear Operators (WANO)

WANO was created to enhance the safety of nuclear power plants worldwide. It was formed in 1989 to facilitate exchange of information and to encourage communication, comparison and emulation among its members in order to maximize nuclear safety and reliability. Its membership includes every organization in the world that is currently operating a nuclear power plant.

World Nuclear Association (WNA)

The WNA is a private sector organization that represents the people and the interests of the nuclear energy sector. Its primary purpose is to promote the use of nuclear energy and its related activities by facilitating member interaction on technical, commercial and policy matters. The technical matters the WNA deals with include those related to safety and security. The association has established working groups to facilitate further interaction on safety issues.

World Nuclear Transport Institute (WNTI)

The WNTI was established in 1998 by the governments of the United Kingdom, France and Japan to regulate the nuclear transport industry. It currently includes 41 companies that work in the nuclear transport industry. Its objective is to ensure the safe and efficient transport of nuclear mat

International Council on Mining and Metals (ICMM)

The ICMM was established in 2001 to represent the world's leading mining and metal companies. Improving the industry's health and safety performance is a part of its work program. Its membership includes uranium producers.

UN Security Council

UNSC Resolution 1373 (2001)

Resolution 1373 was adopted by the Security Council on September 28, 2001 to obligate states to adopt measures to prevent and counter terrorist activities. While primarily addressing terrorist financing and state support, paragraph 4 condemns the illegal movement of potentially dangerous nuclear material. The resolution emphasizes the need to enhance coordination efforts to strengthen the global response to terrorist threats, including nuclear.

UNSC Resolution 1540 (2004)

Resolution 1540 was adopted by the Security Council on April 28, 2004 to commit states to take steps to preventing the proliferation of weapons of mass destruction, including nuclear and radiological weapons. It requires that states work to prevent non-state actors from acquiring these weapons, that states put into effect national legislation outlawing non-state actors from seeking to acquire them and that states take effective measures to prevent their proliferation.

CIGI's Nuclear Energy Futures Publications

"Russian Nuclear Industry – Status and Prospects"
Miles Pomper
Nuclear Energy Futures Paper No. 4
Forthcoming, November 2008

"British Nuclear Industry – Status and Prospects"
Ian Davis
Nuclear Energy Futures Paper No. 3
Forthcoming, November 2008

"Legal Regimes for Nuclear Safety and Security"
Aaron Schull
Nuclear Energy Futures Paper No.2
Forthcoming, November 2008

"The Economics of Nuclear Power: Current Debates and Issues for Future Consideration"
David McLellan
Nuclear Energy Futures Paper No.1
February 2008

GNEP Watch: Developments in the Global Nuclear Energy Partnership
A monthly report prepared by Miles Pomper in Washington DC for the CIGI Nuclear Futures Project

"GNEP Membership may Double, but Domestic Future in Doubt"
GNEP Watch, No. 9
August 2008

"US House Panel Slashes GNEP Funding, but Bush Administration Continues Supporting Expansive Vision"
GNEP Watch, No. 8
July 2008

"US-Russia Agreement Could Advance GNEP, But Congressional Watchdog Challenges Program Direction"
GNEP Watch, No. 7
June 2008

"US Administration Leaves Key GNEP Decisions to Next President"
GNEP Watch, No. 6
April/May 2008

"Bush Administration Seeks More Money for GNEP; Senegal and the UK Become Members"
GNEP Watch, No. 5
March 2008

"Canada and South Korea Join GNEP as US Congress Scales it Back"
GNEP Watch, No. 4
January/February 2008

"US Panel Urges Brake on GNEP as US-Russia Technology Deal Moves Ahead"
GNEP Watch, No. 3
December 2007

"GNEP Challenged: Countries Emphasize Uranium Enrichment over Spent Fuel Reprocessing"
GNEP Watch, No. 2
November 2007

"GNEP Wins More Support Abroad than at Home"
GNEP Watch, No. 1
October 2007

The Centre for International Governance Innovation

Centre pour l'innovation dans la gouvernance internationale

About the Centre for International Governance Innovation

The Centre for International Governance Innovation is a Canadian-based, independent, non-partisan think tank that addresses international governance challenges. Led by a group of experienced practitioners and distinguished academics, CIGI supports research, forms networks, advances policy debate, builds capacity, and generates ideas for multilateral governance improvements. Conducting an active agenda of research, events, and publications, CIGI's interdisciplinary work includes collaboration with policy, business and academic communities around the world.

CIGI's work is organized into six broad issue areas: shifting global power; environment and resources; health and social governance; trade and finance; international law, institutions and diplomacy; and global and human security. Research is spearheaded by CIGI's distinguished fellows who comprise leading economists and political scientists with rich international experience and policy expertise.

CIGI has also developed IGLOO™ (International Governance Leaders and Organizations Online). IGLOO is an online network that facilitates knowledge exchange between individuals and organizations studying, working or advising on global issues. Thousands of researchers, practitioners, educators and students use IGLOO to connect, share and exchange knowledge regardless of social, political and geographical boundaries.

CIGI was founded in 2002 by Jim Balsillie, co-CEO of RIM (Research In Motion), and collaborates with and gratefully acknowledges support from a number of strategic partners, in particular the Government of Canada and the Government of Ontario. CIGI gratefully acknowledges the contribution of the Government of Canada to its endowment Fund.

Le CIGI a été fondé en 2002 par Jim Balsillie, co-chef de la direction de RIM (Research In Motion). Il collabore avec de nombreux partenaires stratégiques et exprime sa reconnaissance du soutien reçu de ceux-ci, notamment de l'appui reçu du gouvernement du Canada et de celui du gouvernement de l'Ontario. Le CIGI exprime sa reconnaissance envers le gouvernment du Canada pour sa contribution à son Fonds de dotation.

The Centre for International Governance Innovation

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