

A photograph of a nuclear power plant with three large, blue containment domes. The plant is situated behind a line of green trees, and the entire scene is reflected in a body of water in the foreground. The sky is a clear, light blue.

NRC International Activities Annual Report 2008

**U.S. Nuclear Regulatory Commission
Office of International Programs
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Cover: Brunswick Nuclear Power Plant near Southport, North Carolina

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Message from the Director

During the past fiscal year the Office of International Programs (OIP) received a growing number of requests for assistance on issues not previously addressed by the international regulatory community. These issues include, but are not limited to, new nuclear power plant construction and licensing, significantly expanded regulatory assistance for the control of radioactive sources, sharing of worldwide operating experience information for existing power plants, and revisions to export/import regulations.

On the mind of all regulators is how to meet the challenges of addressing these new issues in a timely manner while maintaining safety and security. As the NRC has learned, operational and strategic flexibility are required in approaching these issues. In this connection I want to express my admiration for the extraordinary efforts of OIP staff in developing creative and innovative solutions to the challenges posed by this evolving regulatory environment as well the leadership demonstrated by the legal and technical staff offices in anticipating the needs of a vibrant and expanding program.

The challenge for fiscal year (FY) 2009 will be to continue to proactively develop strategies for the NRC to lead and partner with regional and multilateral efforts to assist countries considering nuclear energy for the first time and countries expanding existing nuclear programs. To be successful we will need to effectively leverage international resources and carry out timely and efficient information exchanges to ensure our expanding domestic nuclear program benefits from our experienced international partners.

The NRC greatly values its international interactions. Our goal is not only to share information and learn about best practices, but also to be a responsible partner in advancing nuclear safety and security.



Margaret M. Doane

Margaret M. Doane
Director
Office of International Programs

Overview of Accomplishments in FY 2008

We believe that the regulation of our domestic nuclear power program benefits from what we learn as we carry out our international activities. At the same time, a wide range of international partners actively solicit NRC views, cooperation and assistance, thus establishing the basis for productive and effective cooperation and information exchanges. To meet the challenges of an expanding program, in FY 2008 OIP took a more proactive approach to efficiently use our limited resources in support of U.S. Government policies. Accomplishments for FY 2008 include:

- Implementing a strategy to prepare for new reactor construction in the U.S. and to reach out to international counterparts to ensure the sharing of best practices.
- Initiating a pilot program for new reactor licensing assistance projects with countries of the Commonwealth of Independent States (CIS).
- Supporting Program Office development of inspection training activities for countries with developed nuclear programs which may be anticipating new reactor construction in the U.S.
- Participated in the April 2008 Convention on Nuclear Safety review and conducted two dozen bilateral meetings at the annual International Atomic Energy Agency (IAEA) General Conference.
- Ensuring progress in activities related to implementing IAEA safeguards in the U.S.
- Implementing the Code of Conduct on the Safety and Security of Radioactive Sources (Code of Conduct), including revising 10 Code of Federal Regulations (CFR) Part 110.
- Reviewing three government-to-government Section 123 Agreements for Peaceful Nuclear Cooperation and participating in the negotiation of another two Agreements.
- Established new regulatory counterpart information exchange arrangements with Vietnam and Croatia.
- Hosted regulatory information exchanges with 30 countries and Taiwan.
- Exchanging security-related information with designated countries.
- Implementing the Multinational Design Evaluation Program (MDEP) for sharing expertise and resources in reviewing new and future reactor designs.
- Coordinating information exchange activities with the Nuclear Energy Agency (NEA) and the IAEA.
- Participating in IAEA and NEA activities related to research, standards development and state-of-the-art assessment of technical issues.
- Contributing direct funding to two IAEA extra-budgetary research-related programs on the seismic safety of existing power plants and tsunami hazard safety.

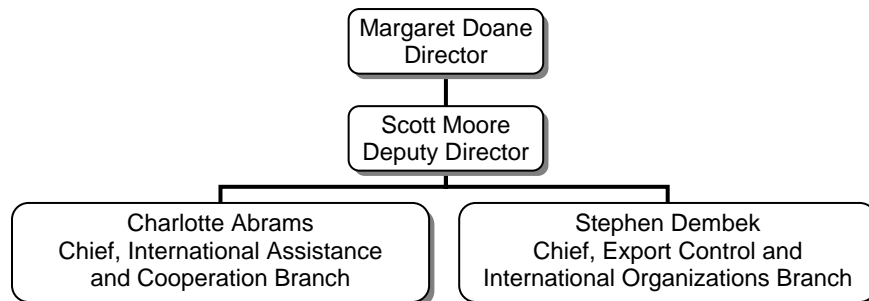
"The NRC's reputation has been built up over many years, by thousands of hard-working men and women. Thanks to their efforts, the NRC's certifications and licenses are considered the gold standard around the world." – Chairman Dale E. Klein

Office of International Programs

OIP implements Commission policy guidance concerning NRC's international activities related to international conventions and treaties, export and import licensing, bilateral activities, multilateral organization programs, and cooperative research. In consultation with other Program Offices, OIP administers the NRC's international programs and provides policy advice and assistance to the Chairman, the Commission, and to NRC management and staff. Some facts and figures about OIP:

- OIP budget for FY 2008: \$ 3,511,000 (does not include infrastructure and support)
- Agency-wide budget for international activities in FY 2008: \$ 11.2 million (includes infrastructure and support)
- OIP human resources: 32 full-time equivalents (FTE)
- Rotational assignments: 4 into OIP from other offices, 2 within OIP, and 2 out of OIP. These assignments are beneficial for cross-training and knowledge transfers, the development of closer inter-office relations, and personal career development.

OIP Organization Chart



OIP staff briefing Foreign Service Officers from the U.S. Department of State on NRC international activities.

Conventions and Treaties

The obligations incurred by U.S. Government-negotiated, legally binding conventions and treaties include nuclear non-proliferation, safety, physical protection, waste and spent fuel management, emergency preparedness and response, and counter-terrorism. In some cases NRC has a leadership role; in others NRC provides technical support to other U.S. Government agencies. Major fiscal year 2008 accomplishments were:

- NRC active participation at the Review Meeting of Contracting Parties to the Convention on Nuclear Safety, including delivering the U.S. National Report.

- Provided policy guidance to the staff and the Commission relative to the implementation of the U.S.- IAEA Additional Protocol for the implementation of IAEA safeguards in the U.S. and coordinated IAEA reporting requirements with stakeholders.

- The United States ratified the Convention on Supplementary Compensation for Nuclear Damage which will likely result in increased requests for technical assistance concerning

new reactor builds from foreign counterparts.

- Participated in U.S. Government preparations for the October 2008 Organizational Meeting and the May 2009 Third Review Meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

- Participated in the first IAEA-hosted Working Group meeting to consider revision of the “recommendations for the Physical Protection of Nuclear Material and Nuclear Facilities”, the guidance document to implement the amended Convention on the Physical Protection of Nuclear Material.

Legal and Policy Basis for NRC’s International Activities

- Statutory Requirements
 - Atomic Energy Act of 1954, as amended
 - 1978 Nuclear Non-Proliferation Act
- International Treaties and Agreements
 - Nuclear Non-Proliferation Treaty
 - IAEA-U.S. Safeguards Agreement
 - Convention on the Physical Protection of Nuclear Material
 - Convention on Early Notification of a Nuclear Accident
 - Convention on Assistance in Case of a Nuclear Accident & Radiological Emergency
 - Convention on Nuclear Safety
 - Convention on Supplementary Compensation for Nuclear Damage
 - Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

“I believe that public involvement and policy decisions must go hand in hand. After all, what we are doing is making public policy. If the public does not feel heard, understood and represented, even the best technical solutions will not come into being.” - Commissioner Gregory B. Jaczko

Nuclear Exports and Imports

The NRC ensures that exports and imports of nuclear materials, facilities and equipment under the Agency's jurisdiction are licensed in accordance with applicable U.S. statutory and regulatory requirements. These exports and imports must also meet U.S. Government commitments towards legally binding international treaties and multilateral and bilateral agreements. The NRC continues to exercise global leadership by adhering to and promoting the adoption of international guidance such as the Code of Conduct. Examples of accomplishments in FY 2008 include:

- Implementation of the Energy Policy Act of 2005 and the Code of Conduct by further refining criteria for approving the export of Category 1 and 2 radioactive sources and initiating the discussion on how to approach Category 3 export approvals.

- Staff is revising 10 CFR Part 110 to address significant ambiguity in current export/import licensing regulations (the draft proposed Part 110 Rule is expected to be published for public comment in early 2009).

- The Commission agreed with OIP's recommendations to approve Section 123 Agreements for Peaceful Nuclear Cooperation with Russia, India, and Turkey. In addition, OIP staff participated in U.S. Government negotiations for Section 123 Agreements with

Jordan and the United Arab Emirates.

- To address increased numbers of complex waste export/import license applications, NRC is coordinating with all stakeholders and Congress to ensure full transparency of the process.

- Participation in international meetings of the Nuclear Suppliers Group which coordinates common approaches to licensing dual-use items.

- Export/import licensing actions for FY 2008: 112 applications received, 133 licenses issued, 136 licensing actions completed. Completed five 10 CFR Part 810 reviews and three subsequent arrangements in coordination with relevant Executive Branch agencies.

Commodities Under NRC Export Licensing Authority

- Nuclear reactors (10 CFR 110 Appendix A)
- Uranium enrichment facilities (10 CFR 110 Appendices B-H)
- Spent fuel reprocessing plants (10 CFR 110 Appendix I)
- Uranium and plutonium conversion plants (10 CFR 110 Appendix J)
- Heavy water or deuterium production plants (10 CFR 110 Appendix K)
- Nuclear fuel fabrication plants (10 CFR 110 Appendix O)
- Lithium isotope separation facilities (10 CFR 110 Appendix N)
- Equipment, component parts, and assemblies that are especially designed or prepared for exclusive use in any of the aforementioned facilities
- Special nuclear material (e.g., plutonium, enriched uranium, uranium-233)
- Source material (e.g., natural and depleted uranium, thorium)
- Byproduct material (10 CFR 110 Appendix L and Appendix P)
- Deuterium (heavy water)
- Nuclear grade graphite for nuclear end use (see 70 Federal Register 41937, July 21, 2005)

The commodities under NRC import licensing authority (10 CFR 110.9a) include the following:

- Nuclear production and utilization facilities
- Special nuclear, source and byproduct material

Bilateral Cooperation

The NRC engages in a broad range of nuclear safety, security and emergency preparedness activities with foreign countries through bilateral arrangements and other exchange mechanisms (see table on next page). Accomplishments in FY 2008:

- Two new bilateral technical exchange arrangements (Vietnam and Croatia) and four renewals (Argentina, China, Japan, United Kingdom).

- Chairman and/or Commission regulatory information exchanges and site visits to 14 foreign countries and Taiwan: Hungary, France, Canada, Mexico, Norway, Netherlands, Finland, China, Switzerland, Turkey, United Kingdom, Japan, South Korea, and Germany.

- Hosted regulatory information exchanges at all levels with 30 countries and Taiwan. The visiting countries included: Argentina, Armenia, Australia, Bahrain, Brazil, Canada, Chile, China, France, Germany, Indonesia, Iraq, Israel, Japan, Lithuania, Namibia, Netherlands, Norway, Pakistan, Russia, Singapore, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, and Vietnam.

- Developed an integrated staff approach and enhanced coordination with U.S. Government agencies to manage new Commission and Congressional funding for assistance activities and new reactor activities.

- Initiated a pilot program for new reactor licensing assistance projects with countries of the CIS (with Program Office support). Established successful regulatory nuclear safety and radioactive source control programs in Armenia, Kazakhstan and Georgia and expanding the programs to Azerbaijan,

Kyrgyzstan, Tajikistan, Uzbekistan, Moldova and Ukraine.

- Using \$ 2M funding from Congress NRC began outreach activities in the areas of regulation and radioactive source control with several Middle Eastern and African countries.

- Effectively leveraged NRC resources and prepared for anticipated new build in the U.S. by conducting in-depth consultations with countries already building new plants (Finland, Japan, Canada).

- Provided policy guidance and supported Program Office development of inspection training activities with countries with developed nuclear programs. The inspection activities include on-site observation of construction inspections and exchanges of quality assurance methodologies.

- Assessed the effectiveness of programs and procedures implemented by international vendors providing parts and services to the commercial nuclear industry. Staff conducted bilateral technical exchanges with Japan, South Korea, Finland, France, Canada, China, and the United Kingdom to improve cooperation in the area of vendor oversight.

- Exchanged security-related information with designated countries.

- Hosted over 300 foreign assignees since 1974. In FY 2008 NRC hosted 5 assignees from Japan, South Korea and Romania.

*“The challenges faced by the NRC in maintaining safety and security, providing for lasting technical competence, and improving the effectiveness of our communications with the public, are not different from challenges faced by nuclear regulators and the nuclear industry world-wide.” -
Commissioner Peter B. Lyons*

Technical Information Exchange and Cooperation Arrangement and Letter of Agreement Partners

Argentina	Germany	Romania
Armenia	Greece	Russia
Australia	Hungary	Slovak Republic
Belgium	Indonesia	Slovenia
Brazil	Israel	South Africa
Bulgaria	Italy	South Korea
Canada	Japan	Spain
China	Kazakhstan	Sweden
Croatia	Lithuania	Switzerland
Czech Republic	Mexico	(Taiwan)
Egypt	Netherlands	Ukraine
Finland	Peru	United Kingdom
France	Philippines	Vietnam



AP1000 reactor training in China. NRC is engaged in active cooperation with our counterparts in China to support their licensing efforts for the Westinghouse AP1000 reactors they have purchased.

NRC staff visiting a Japanese reactor under a bilateral exchange program. During 1974, as the Energy Reorganization Act progressed through Congress, the Atomic Energy Commission (AEC) negotiated and signed the first technical information exchange arrangements with Japan (5/74), France (6/74), Spain (10/74), Sweden (12/74) and Switzerland (12/74). Later, they were seamlessly passed from the AEC to the newly created NRC on January 17, 1975, and were soon followed by arrangements with the United Kingdom (3/75), Italy (5/75), and Germany (10/75), growing to the current total of 38.



Multilateral Cooperation

Multilateral cooperation activities includes NRC participation in the ongoing nuclear safety work of the NEA through its Steering Committee and its Committees on regulatory activities, safety of nuclear installations, waste management, and radiation protection and public health. Seventeen of the NEA's 28 member countries account for approximately 85% of the world's installed nuclear capacity and nuclear power accounts for almost a quarter of the electricity produced in NEA member countries.

The NRC also participates in the full range of the IAEA's activities, including nuclear safety, international safeguards, security, emergency preparedness, and technical assistance.

Other multilateral organizations with which the NRC interacts include: the International Commission on Radiological Protection (ICRP), which provides recommendations and guidance on all aspects of protection against ionizing radiation; support for the Department of State in the Nuclear Safety and Security Working Group of the Group of Eight; and the International Nuclear Regulators Association (INRA), a group consisting of senior regulators from nine countries which focuses on regulatory issues of mutual concern. Accomplishments in FY 2008 include:

- Successful completion of the MDEP pilot project launched in 2006 under the auspices of the NEA. The project addressed the licensing basis for the review of new designs and component manufacturing oversight, concluding that significant benefits would be gained by continuing this multilateral effort.
- NRC's Operating Experience (OpE) program, which collects, evaluates, communicates and applies OpE information, systematically screens and evaluates all international OpE from the joint NEA/IAEA Incident Reporting System and from the World Association of Nuclear Operators significant event reports as provided by the Institute of Nuclear Power Operations.
- NRC has been a key sponsor of the web-based database of the Joint IAEA/NEA Fuel Incident Notification and Analysis System which went live on October 1, 2008.
- The ICRP published a new revised set of recommendations in December 2007 as ICRP Publication 103. Through its active participation in the NEA's Committees on Radiation Protection and Public Health and its own review, NRC is preparing options for Commission consideration.
- In FY 2008 staff participated in over 90 IAEA activities, such as assessment missions (including approximately three Integrated Regulatory Review Service (IRRS) missions and two Operational Safety Review Team missions per year), development of international safety, security, transportation and emergency preparedness guidance, and implementation of IAEA safeguards at NRC-licensed facilities.
- NRC's leadership role in the revision of the IAEA's Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Sources. NRC is assuring the revisions to this important document are well thought-out and occur at a reasonable pace to accommodate possible consequential changes to U.S. national legislation.
- NRC is providing a cost-free expert to the IAEA Department of Technical Cooperation to further leverage its assistance program with countries considering embarking on a nuclear power program.
- The NRC hosted the INRA meetings in 2008. INRA issued a statement encouraging countries that are considering expanding their programs for peaceful uses of nuclear energy,

and those developing new nuclear programs, to adopt programs of continuous improvement in nuclear safety. The INRA statement was sent to the IAEA asking for assistance in conveying the message to all of IAEA's Member States.

- NRC coordinated with the Departments of State and Energy on IAEA nuclear security activities.

- Staff provided substantive and logistical support for Chairman Klein's presentation of the well-received U.S. National Report at the April 2008 Convention on Nuclear Safety.

- OIP coordinated with the Program Offices in the policy aspects of hosting an IRRS mission in the U.S. in 2010.

NRC Representation on IAEA and NEA Committees

IAEA Safety Committees

Commission on Safety Standards
Radiation Safety Standards Committee
Waste Safety Standards Committee
Nuclear Safety Standards Committee
Transportation Safety Standards Committee

NEA Committees and Associated Working Parties / Working Groups

Committee on Nuclear Regulatory Activities
Working Group on Inspection Practices
Working Group on Operating Experience

Committee on the Safety of Nuclear Installations
Program Review Group
Working Group on Risk Assessment
Working Group on Analysis and Management of Accidents
Working Group on Human and Organizational Factors
Working Group on Integrity and Aging of Components and Structures
Fuel Cycle Safety Committee
Working Group on Fuel Safety

Radioactive Waste Management Committee
Regulators' Forum
Forum on Stakeholder Confidence
Working Party on Decommissioning and Dismantling
Integration Group for the Safety case of Radioactive Waste Repositories

Committee on Radiation Protection and Public Health

"The NRC faces many challenges... but none, in my view, are insurmountable. What success will require, however, is a sustained commitment to continual improvement in our processes and an eye always to safeguarding the trust that the public has resided in us."

– Commissioner Kristine L. Svinicki

Cooperative Research

NRC has an active program of domestic nuclear regulatory research. The NRC's international cooperative research activities support these programs by leveraging research resources with other countries. The benefits of joint use of research facilities and cost-sharing are pooling of expertise and the ability to maintain up-to-date infrastructures to implement a risk-informed, performance-based, and realistically conservative regulatory framework.

Research areas:

- Reactor vessel and piping integrity
- Aging of reactor components
- Thermal-hydraulic codes
- Nuclear fuels analysis
- Plant performance
- Seismic safety
- Probabilistic risk assessment
- Severe accidents
- Reactor containment structural integrity
- Dry cask storage and transport
- Decommissioning
- Fire protection
- Human reliability

Long-Term Research Areas and Activities:

- Global Nuclear Energy Partnership
 - Reactor license renewal beyond 60 years
 - Test facilities: integral effects test
 - Facilities for advanced non-light water reactors
- Cross-Cutting Research:**
- Multiphase computational fluid dynamics
 - Advanced modeling techniques for level 2/3 probabilistic risk assessment.
 - Advance fabrication techniques
 - Extended in situ and real-time inspection & monitoring capabilities
 - Offsite mitigation strategies

Some Facts About Cooperative Research

- About 63 percent of the 335 nuclear power reactors operating outside the U.S. are based on or derived from U.S. technology. In addition to identifying generic issues, the common design elements of these reactors provide a basis for sharing research and development resources.
- The NRC maintains cooperative research agreements with the Organization for Economic Co-operation and Development and 23 countries and Taiwan: Argentina, Armenia, Belgium, Brazil, Bulgaria, Canada, Croatia, Czech Republic, Finland, France, Germany, Hungary, Japan, Netherlands, Russia, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.
- Responding to the anticipated resurgence of nuclear power in the U.S., industry is proposing to build 32 new plants at 21 sites using 5 different plant designs. Research provides the foundation for ongoing NRC license reviews by providing confirmatory data of safety systems that support NRC's ability to review current designs and by providing data to support updates to analytical tools.
- Advanced reactors are fundamentally different from existing reactors and some existing regulatory tools (codes, data, etc.) can't be applied because of insufficient research results. Because of resource and time constraints research related to nuclear safety for advanced reactors will most likely have to be shared between the owners/vendors of nuclear power plants and regulators/governments.

"... there is a very concerted effort under way by regulators around the world to work together, share information, and harmonize—as much as possible—the codes and specifications for new plants. So some of our employees are dedicated entirely to maintaining and strengthening our international programs, and working with other regulators across the globe to improve nuclear safety and security."
— Chairman Dale E. Klein

Future Challenges

According to the NEA Nuclear Energy Outlook for 2008, by 2050 global nuclear installed capacity is projected to range between 580 and 1,400 gigawatts of electric (GWe) capacity as compared with 372 GWe in 2007. The NEA high scenario projects an increase in nuclear capacity of just over 1,000 GWe by 2050, while the low scenario projects an increase of just over 200 GWe. By 2020 the largest installed nuclear capacities will be in the United States, France, Japan, Russia, China and South Korea with the United States and China having the largest planned increases in capacity. A number of currently non-nuclear-power countries plan to build reactors but they are likely to add only about 5% to installed global capacity by 2020. Nuclear energy development in the future will be led by the United States, France, Japan, Russia, China and South Korea.

According to press reports and official government releases these countries currently do not have nuclear power reactors but are in the process of constructing or considering the construction of nuclear power plants: Albania, Algeria, Australia, Azerbaijan, Bahrain, Bangladesh, Belarus, Chile, Egypt, Estonia, Georgia, Ghana, Indonesia, Iran, Ireland, Israel, Italy, Jordan, Kazakhstan, Kuwait, Latvia, Libya, Malaysia, Morocco, Namibia, Nigeria, Norway, Oman, Philippines, Poland, Portugal, Qatar, Saudi Arabia, Syria, Thailand, Tunisia, Turkey, Uganda, United Arab Emirates, Venezuela, Vietnam, and Yemen.

The Director General of the IAEA, in his speech at the opening of the 2008 IAEA General Conference, noted that in the last two years, some 50 Member States had expressed interest in considering the possible introduction of nuclear power and that twelve countries are actively preparing to introduce nuclear power.

The expansion of the global nuclear power industry poses financial, manufacturing, and human resource challenges for governments as well as for private enterprises. Challenges for regulators will be the continued need to ensure that they have the necessary staff, expertise, and policies in place to oversee the safe expansion of nuclear power while remaining closely focused on ensuring the safety and security of existing nuclear facilities.

Conventions and Treaties

Staff will participate in resource-intensive U.S. Government preparations for:

- The 2009 Joint Convention Review Meeting
- The 2010 Nuclear Non-Proliferation Treaty Review Conference
- Revising international guidance to implement of the Convention on the Physical Protection of Nuclear Material
- Increasing U.S. reporting methods to conform with the Additional Protocol for implementing IAEA safeguards in the U.S.

Nuclear Exports and Imports

Staff is preparing for an increase in all aspects of exports and imports:

- Changes in the international nuclear industry will require a new look at NRC's export and import licensing regime.
- Anticipating an increase in exports of reactors and major components associated with proposals for nuclear power plant construction in the U.S. and world-wide.
- Evolving complexity of licensing in areas such as the fuel cycle and waste management requires staff to broaden experience and in-depth knowledge of domestic and international export-import licensing regimes.

- Review of potential new government-to-government Peaceful Uses of Nuclear Energy Agreements will require legal, policy and technical expertise as well as country-specific knowledge.

Bilateral Cooperation

Implementing new strategies for anticipated significant increases in bilateral cooperation and assistance will encompass safety and security issues associated with new and existing nuclear power plants, research reactors, radioactive sources, and nuclear materials. The address these demands staff will:

- Implement a low-cost, effective regulatory assistance for sources, including coordination within the U.S. Government, with the IAEA, and with other donor governments.
- Participate in vendor inspections and training in other countries.
- Shadow foreign regulators as they inspect nuclear power plants and fuel cycle facilities under construction.
- Respond to increases in requests for bilateral exchanges of technical information through international assignments for the staff, participation in seminars, workshops and assessment missions over the next three to five years.

Multilateral Cooperation

NRC can further leverage scarce resources by participating in a variety of multilateral fora and addressing a range of technical and policy issues. For example:

- New nuclear power programs and expansion of present ones will increase collaboration with

the NEA, the IAEA, and other multilateral organizations.

- Staff can improve the balance of safety and security in regulating the nuclear industry in the U.S. and achieve international consensus by proactive participation in bilateral and multilateral meetings.

- NRC will continue to develop common approaches with IAEA Member States when addressing the various aspects of security, from the design basis threat to insider threats and sabotage.

- Over the next 2-3 years, staff anticipates that the IAEA will seek to develop and promulgate over a dozen documents relating to security, as well as revise many safety documents. These will need to be reviewed simultaneously with revisions to national regulations to ensure U.S. compliance with the least possible impact on the U.S. regulatory program and licensees.

Cooperative Research

NRC will need to assure that it continues to have access to foreign facilities, that NRC staff has opportunities to build on their knowledge through interaction with counterparts, and that current and future research reflect the new security challenges. This will be accomplished by:

- Preparing for challenges associated with the construction and regulation of new reactors.

- Ensuring research continues to address long-term safe operation of existing reactors.

- Promoting the study of new fuels and materials.

- Continuing to review proposed NEA programs to ensure that they are directed to regulatory needs.

Status of World Nuclear Power Reactors

Status as of October 2008

Country	Operating		Construction		Planned		Proposed	
	No.	MWe	No.	MWe	No.	MWe	No.	MWe
Argentina	2	935	1	692	1	740	1	740
Armenia	1	376	0	0	0	0	1	1,011
Belgium	7	5,728	0	0	0	0	0	0
Brazil	2	1,901	0	0	1	1,245	4	4,000
Bulgaria	2	1,906	0	0	2	1,900	0	0
Canada	18	12,595	2	1,540	3	3,300	4	4,400
China	11	8,587	7	6700	26	27,620	76	62,600
Czech Republic	6	3,472	0	0	0	0	2	3,400
Finland	4	2,696	1	1,600	0	0	1	1,000
France	59	63,473	1	1,630	0	0	1	1,600
Germany	17	20,339	0	0	0	0	0	0
Hungary	4	1,826	0	0	0	0	2	2,000
India	17	3,779	6	2,976	10	8,560	9	4,800
Iran	0	0	1	915	2	1,900	1	300
Japan	55	47,577	2	2,285	11	14,945	1	1,100
Lithuania	1	1,185	0	0	0	0	2	3,400
Mexico	2	1,310	0	0	0	0	2	2,000
Netherlands	1	485	0	0	0	0	0	0
Pakistan	2	400	1	300	2	600	2	2,000
Romania	2	1,310	0	0	2	1,310	1	655
Russia	31	21,743	7	4,920	12	14,340	25	22,280
Slovakia	5	2,094	2	840	0	0	1	1,200
Slovenia	1	696	0	0	0	0	1	1,000
South Africa	2	1,842	0	0	1	165	24	4,000
South Korea	20	17,533	3	3,000	5	6,600	2	2,700
Spain	8	7,442	0	0	0	0	0	0
Sweden	10	9,086	0	0	0	0	0	0
Switzerland	5	3,220	0	0	0	0	3	4,000
Ukraine	15	13,168	0	0	2	1,900	20	27,000
United Kingdom	19	11,035	0	0	0	0	0	0
USA	104	100,599	0	0	12	15,000	20	26,000
(Taiwan)	6	4,884	2	2,600	0	0	0	0
WORLD	439	371,258	36	25,073	92	80,531	206	179,345

Sources: WNA, IAEA

Acronyms and Web Addresses

Acronyms

CFR	Code of Federal Regulations
CIS	Commonwealth of Independent States
FTE	Full-time Equivalents
FY	Fiscal Year
GWe	Gigawatts electric
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
INRA	International Nuclear Regulators Association
IRRS	Integrated Regulatory Review Service
MDEP	Multinational Design Evaluation Program
NEA	Nuclear Energy Agency
OIP	Office of International Programs
OpE	Operating Experience

Web Addresses (URLs)

CFR	www.gpoaccess.gov/CFR/INDEX.HTML
CIS	www.cis.minsk.by
IAEA	www.iaea.org
ICRP	www.icrp.org
INPO	www.inpo.info
MDEP	www.nea.fr/mdep/welcome.html
NEA	www.nea.fr
NRC	www.nrc.gov
NSG	www.nuclearsuppliersgroup.org
OIP	www.nrc.gov/about-nrc/organization/oipfuncdesc.html
WANO	www.wano.org.uk
WNA	www.world-nuclear.org

Notes