Integrated Regulatory Review Service Mission to the United States

MODULE 2: GLOBAL NUCLEAR SAFETY REGIME

Overview

The U.S. Nuclear Regulatory Commission's (NRC's) international activities are wide ranging, encompassing international nuclear policy formulation; export-import licensing for nuclear materials and equipment; treaty implementation; nuclear nonproliferation; international safety cooperation and assistance; safeguards support and assistance; international regulatory, safety, and security information exchange; and cooperative safety research. These activities support the NRC's domestic mission with respect to the safety and security of nuclear reactors, nuclear material, and nuclear waste.

The legal bases for the NRC's international activities are contained in two principal pieces of legislation: the Atomic Energy Act of 1954, as amended and the 1978 Nuclear Non-Proliferation Act. As part of its mission, the NRC seeks to support U.S. interests in the safe and secure use of civilian nuclear facilities and material and in nuclear nonproliferation. A principal basis for the NRC's participation in these international activities is the role they play in facilitating the NRC's domestic regulatory responsibilities. The NRC uses bilateral and multilateral arrangements with international regulators to improve its efficiency and effectiveness through sharing of lessons learned and best practices.

International Obligations and Arrangements for Cooperation

> *The government shall fulfil its respective international obligations, participate in the relevant international arrangements, including international peer reviews, and promote international cooperation to enhance safety globally.(GS-R-1, Requirement 14)*

U.S. Foreign Policy

The NRC coordinates its international interests and activities with the U.S. Executive Branch, including the National Security Council, the Departments of State, Energy, Commerce, Defense, and Homeland Security, the Environmental Protection Agency, and other agencies as appropriate. These Executive Branch agencies and others that promote U.S. interests abroad typically consult with the NRC on international activities in its areas of interest and expertise. In turn, the NRC submits for Executive Branch comment and clearance or approval its proposed international agreements and requests for technical or diplomatic support from other agencies as appropriate.

Conduct of International Activities

Implementation of international activities requires informed judgments of U.S. policy interests and of the relative costs and merits, including efficiency and effectiveness considerations, of competing uses of resources in the pursuit of NRC goals. These day-to-day decisions also involve practical considerations, such as the timing of the activity and the availability of key people required for success.

Some of the objectives of the NRC's highest priority international activities include (1) obtaining and using non-U.S. safety and security information that will alert the NRC to potential problems and threats, (2) helping to identify potential accident precursors, and (3) providing accident and incident analyses—including lessons learned—directly applicable to the safety and security of U.S. nuclear power plants and other facilities and to the safe and secure use of nuclear material.

Examples of these activities include the following:

- Assess the safety and security significance of foreign nuclear accidents or incidents for civilian power reactors and uses of radioactive materials, including all those rated 2 or higher on the International Nuclear Events Scale, to understand the implications for the NRC and its licensees.

- Exchange information with countries having experience of special relevance to the NRC's programs concerning the safety and security of nuclear material, waste, and reactors.

- Maintain appropriate levels of NRC research cooperation with countries having mature nuclear power programs directly or through, for example, the International Atomic Energy Agency (IAEA), the Organisation for Economic Co-operation and Development's (OECD) Nuclear Energy Agency (NEA), or the European Union to leverage NRC resources to examine key technical issues in regulating the safety and security of existing and proposed U.S. commercial nuclear facilities and the safe and secure use of nuclear materials.

Information Exchange Activities

The NRC exchanges safety-related information through both formal and informal arrangements, including conventions and treaties, codes of conduct, bilateral agreements with States, and memoranda of understanding, to help fulfill safety and security obligations and to promote cooperation.

Conventions and Treaties

Treaties that legally bind the NRC and the U.S. Government's peaceful uses of nuclear energy and nuclear applications include the 1978 Nuclear Non-Proliferation Treaty, the 1980 Convention on Physical Protection of Nuclear Material, the 1986 Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency, the 1994 Convention on Nuclear Safety, the 1986 Convention on Early Notification of a Nuclear Accident, and the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. NRC staff members regularly participate in international meetings related to these conventions and have held a variety of leadership positions in their negotiation and implementation. In its bilateral work with regulatory counterparts worldwide, the NRC exchanges experience and good practices in order to further the goals of these international instruments.

In addition to these legally binding obligations, the United States has agreed to comply with certain activities to enhance the safe and secure uses of nuclear applications. For example, the United States has made a political commitment to implement the Code of Conduct on the Safety

and Security of Radioactive Sources. This commitment has been codified in U.S. statute as part of the Energy Policy Act of 2005 and is reflected in the NRC's export and import regulations.

Multilateral Activities

For many years, the NRC has provided both regular budget and cost-free expert staff support to IAEA, as well as participants in safety and security missions, conferences, steering groups, safety and security standards committees, consultancies, and technical meetings. The NRC supports roughly 100 IAEA meetings and missions each year. The NRC also serves in various membership and leadership capacities at OECD NEA, with representation at a variety of levels on NEA's standing safety technical committees and associated working groups. The NRC similarly supports the International Commission on Radiological Protection, the United Nations Scientific Committee on the Effects of Atomic Radiation, and other multilateral activities. The NRC also is a party to several multinational activities, including the Multinational Design Evaluation Program (with OECD NEA).

The NRC has bilateral technical information exchange arrangements with 40 Member States (plus Taiwan) and approximately 100 research agreements. Agreements like these have been in existence since 1974, typically have 5-year terms, and are regularly renewed if both parties agree.

The terms of these bilateral arrangements provide for the exchange, as appropriate, of information including, but not limited to, the following:

- topical reports about technical safety, radiation protection, waste management, and environmental effects written by or for one of the parties as a basis for, or in support of, regulatory decisions and policies

- documents relating to significant licensing actions and safety and environmental decisions affecting nuclear facilities

- detailed documents describing the NRC process for licensing and regulating certain U.S. facilities designated by the other party as being similar to certain facilities being built or planned in that country, and equivalent documents on the other party's facilities

- reports on operating experience, such as reports on nuclear incidents, accidents, and shutdowns, and compilations of historical reliability data on components and systems

- regulatory procedures and standards for the safety, radiation protection, waste management, and environmental impact evaluation of nuclear facilities

- early advice of important events, such as serious operating incidents and government-directed reactor shutdowns, that are of immediate interest to the parties

- copies and applicability of regulatory standards

- exchange of expertise in other areas of common interest

On a routine basis, the NRC hosts regulatory counterparts for bilateral information exchanges at both staff and Commission levels. In addition, NRC Commissioners visit a variety of countries each year to meet with their counterparts and visit those countries' nuclear facilities, which provide invaluable insights that benefit NRC programs. Further, NRC Commissioners and senior managers participate in bilateral meetings with foreign counterparts during international events such as the annual IAEA General Conference and convention review meetings. The NRC also has hosted more than 300 regulatory agency assignees, representing approximately 50 countries, for on-the-job training.

It should be noted that NRC cooperation is not constrained to formal bilateral agreements. The NRC engages with international regulatory counterparts in a variety of other ways, including multinational workshops and IAEA fellowships. The NRC's annual Regulatory Information Conference gives the agency an opportunity to engage bilaterally with visiting counterparts and encourage them to participate in panel discussions in both internationally and technically focused topical sessions.

International Assistance Programs

In the late 1980s, the NRC began offering assistance—first to the Soviet Union (post-Chernobyl), then to nuclear regulatory programs in individual countries of the former Soviet Union. NRC efforts initially focused on safety upgrades and regulatory strengthening in those countries in which at-risk Soviet-designed reactors were in operation.

Following the September 11, 2001, terrorist attacks, the NRC expanded its efforts to specifically include providing assistance to countries in their efforts to improve regulatory oversight of radioactive sources. The NRC is also providing bilateral regulatory assistance to countries seeking to establish nuclear power programs, in close consultation with IAEA. The U.S. Government and IAEA are both actively promoting regional cooperation and have engaged in workshops and training activities to further that goal.

Research Programs

The NRC conducts confirmatory regulatory research through more than 100 multilateral agreements, in partnership with nuclear regulatory agencies and technical support institutes in more than 20 countries. This research supports regulatory decisions on emerging technologies, aging equipment and facilities, seismic, severe accident, and various other safety issues. The NRC and other nuclear regulatory and safety organizations carry out cooperative research projects to achieve mutual research needs with greater efficiency. The NRC and its partners currently conduct this research under the Cooperative Severe Accident Research Program, the Code Applications and Maintenance Program, and the Steam Generator Tube Integrity Program.

Sharing of Operating Experience and Regulatory Experience

> *The regulatory body shall make arrangements for analysis to be carried out to identify lessons to be learned from operating experience and regulatory experience, including experience in other States, and for the dissemination of the lessons learned and their use by authorized parties, the regulatory body and other relevant authorities. (GS-R-1, Requirement 15)*

NRC Reporting on Operating Experience and Incidents

The NRC continues to strive for excellence in the use and sharing of international operating experience (OpE), routinely working closely with the international community to share domestic OpE and learn about international experiences (Reference: Module 11B for more information on the NRC's OpE Program). NRC involvement includes, but is not limited to, bilateral exchanges, discussions in multinational groups (including the OECD NEA Committee on Nuclear Regulatory Activities Working Group on Operating Experience), and participation in conferences and various other IAEA-sponsored meetings. NRC staff members participating in these activities, report on them in both informal discussions and formal trip reports. These reports are electronically shared throughout the agency. Staff members incorporate the insights gained from these activities into recommendations for improvements in NRC programs and processes.

The NRC reviews international OpE information in the same manner as domestic OpE. The Operating Experience Branch reviews events reported through the International Nuclear and Radiological Event Scale and the Web-based International Reporting System for Operating Experience as they are posted for their safety significance and generic applicability to U.S. plants. Other sources of information considered in the review process include media reports, reports from staff involved in international meetings, and information provided in accordance with formal international agreements. Actions taken may include forwarding the information to relevant technical review groups, posting an internal communication on the issue, or screening the issue for further review as an Issue for Resolution in accordance with the criteria of Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC 401, "NRR Reactor Operating Experience Program."

During the screening process, the staff decides whether or not events need to be communicated to interested stakeholders or require further technical evaluation. However, even those events that are screened out are stored for future reference. From this screening, the NRC staff has shared many international events with appropriate internal technical staff through the Web-based OpE Community Forum, and through e-mails to technical review groups for consideration in trending analysis. For those international events screened in because of their risk significance and potential generic applicability to current operating reactors, the NRC staff evaluates appropriate applications of the information to reduce the probability of a recurrence of the event at a U.S. plant. Possible applications include management briefings, generic communications, changes to inspection procedures, initiation of rulemaking, or referral to the Office of Nuclear Regulatory Research for more indepth analysis.

In addition, the NRC evaluates all domestic events reported to the NRC Operations Center using the International Nuclear and Radiological Event Scale. All events rated level 2 or higher, or requested by another IAEA member nation, are transmitted to IAEA for posting to the publicly available Nuclear Events Web-based System. On a quarterly basis, the NRC submits reactor-related generic communications to the International Reporting System for Operating Experience, which is available to regulators and other nuclear organizations around the world. A number of operating experience documents, such as NRC generic communications, event notifications, and reports of manufacturing defects under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 21, "Reporting of Defects and Noncompliance," are published on the NRC public Web site, which is available to the general public and the international community.

International Sharing of Operating and Regulatory Experience

The NRC has several international programs and agreements that provide light-water reactor operational information, as well as research related to various technical disciplines. For example, in the area of materials degradation at international light-water reactors, the NRC participates in a program that documents all available OpE for stress-corrosion cracking events worldwide. The NRC also participates in the OECD NEA Halden Reactor Project and cooperates in international initiatives on nuclear safety culture. NRC license requirements are also drawn from multiple sources including international consensus standards. NRC activities have benefited from this mutual cooperation.

The NRC has also benefited greatly from participation in IAEA review services, such as Integrated Regulatory Review Service and Operational Safety Assessment Review Team missions. These activities provide another avenue for the NRC to consider its practices in the context of international nuclear programs and standards, share information and lessons learned, and evaluate potential ways to enhance the effectiveness of NRC programs.

In addition, the staff performs inspections of components in other countries during their fabrication. The NRC has import licensing authority for nuclear production and utilization facilities, as well as for special nuclear material, source material, and byproduct material.

Assessment Summary

The NRC performed its complementary self-assessment before the new 2010 IRRS guidance that created this module, Global Nuclear Safety Regime, was issued. However, areas for improvement initially identified in other modules, also apply for Module 2.

The staff will consider additional ways to utilize international standards developed by organizations such as IAEA and the International Organization for Standardization and explore ways to harmonize U.S. and international standards. In addition, the staff will continue to assess additional ways to participate in international activities and communicate the importance and value of the activities that provide a direct or indirect benefit to the NRC.