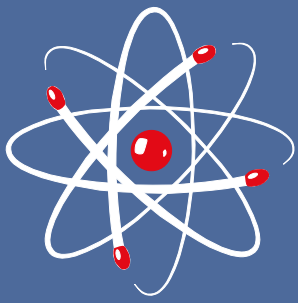

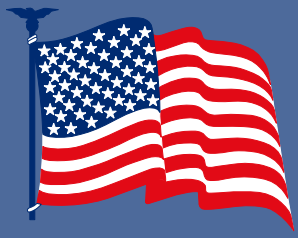

The U.S. Nuclear Regulatory Commission and How It Works

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ABSTRACT

This brochure describes the programs used by the U.S. Nuclear Regulatory Commission (NRC) to fulfill its primary mission for the regulation of the Nation's civilian use of byproduct, source, and special nuclear materials to ensure the adequate protection of the public's health, safety, and environment. It will briefly provide some historical perspectives and legislative mandates, describe the major NRC programs as well as how the NRC goals are accomplished, and discuss the mechanisms by which NRC oversight is implemented. Finally, it will provide information on NRC's administrative and rulemaking processes as well as dicsuss participation opportunities available to the public that can assist NRC in its regulatory oversight mission. It has been developed for use by members of the public, licensees and certificate holders, and new NRC staff.

ACKNOWLEDGEMENTS

NUREG/BR-0256 originated from a course taught at the 1998 Health Physics Society Summer at the University of Wisconsin, River Falls, 6-10 July 1998. Although many various topics were presented, a majority of individuals registered for this summer school requested that the Nuclear Regulatory Commission's (NRC's) presentation be able to clearly describe the mechanisms and processes by which the Commission operates on a daily basis. A major contributor, co-author, and presenter at that presentation was Ms. Charleen T. Raddatz, of NRC's Office of Nuclear Material Safety and Safeguards. Her dedicated effort and attention to detail in that project made the development, update, and completion of this brochure a much simpler task. In addition, the author is grateful for the encouragement and publication approval given by Dr. Carl J. Paperiello, Deputy Executive Director for Materials, Research and State Programs, NRC.

CONTENTS

1 INTRODUCTION

This document describes how the U.S. Nuclear Regulatory Commission (NRC) fulfills its primary mission. It provides some historical perspective and describes the major NRC programs as well as other means used to accomplish its goals. Finally, it provides information on how you can participate in NRC's regulatory oversight mission. Hopefully, it will prove to be of use to members of the public, NRC licensees, and new NRC staff.

NRC's Mission and Safety Philosophy

People may think that the mission of NRC is to manage nuclear power plants. That, of course, is far from the truth. That is the job of the owners and operators that NRC licenses to operate each plant. Ask any member of the NRC staff what the mission of the agency is, and they will without hesitation answer, protection of public health and safety in the use of nuclear material. A more complete description can be found in NRC's 1997-2002 Strategic Plan, which states:

> *NRC's mission is to regulate the Nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection of the public health and safety, to promote the common defense and security, and to protect the environment.*

NRC accomplishes its mission through—

> licensing the construction, operation, and decommissioning of commercial nuclear reactors, nuclear test and research reactors, nuclear fuel cycle facilities, and uranium enrichment facilities;
>
> licensing the possession, use, processing, and exporting of nuclear materials, including certain aspects of transporting and disposing of nuclear materials and wastes;

licensing the siting, design, construction, operation, and closure of low-level radioactive waste disposal sites and a geologic repository for high-level radioactive wastes;

safeguarding nuclear materials and facilities from theft, damage, and sabotage;

supporting U.S. national interests in the safe use and nonproliferation of nuclear materials; and

conducting inspections and developing and enforcing regulations governing these activities.

The process of interpreting NRC's mandate has evolved over several decades of Commission regulation, Congressional oversight, and judicial review of NRC actions. The result has been the creation of a body of regulations, decisions, and practices through which the NRC safety philosophy is expressed. This philosophy comprises several closely interrelated elements:

Defense-in-Depth *ensures that successive measures are incorporated into the design and operating procedures for nuclear installations to compensate for potential failures in protection or safety measures, wherever such failures could lead to serious public or national security consequences.*

Licensee Responsibility *embodies the principle that, although NRC is responsible for developing and enforcing the standards governing the use of nuclear installations and materials, it is the licensee who bears the primary responsibility for conducting those activities safely.*

Safety Culture *recognizes each licensee's responsibility to establish and maintain a set of attitudes and operational principles to ensure that safety issues get the attention they warrant. A safety culture encourages a questioning and learning attitude toward safety issues and discourages complacency.*

Regulatory Effectiveness *emphasizes the approach that, because safety is paramount in the Commission's regulatory program, certain standards and practices to ensure ade-*

quate protection will be required, whatever the cost. Over and above that baseline, additional safety upgrades will be required only if their benefits justify the added cost. Regulatory Effectiveness also involves the ongoing examination of NRC regulations, internal procedures, and oversight activities, to ensure consistency, fairness, ease of implementation, and compatibility with the overall NRC mission and program.

Accountability to the Public *dictates that, just as licensees are accountable to the NRC, the NRC is accountable to the American people and to their elected representatives. This accountability entails being candid about NRC activities and their results, acknowledging the public interest and right-to-know about safety issues, and ensuring that the public has sound, complete, up-to-date information on which to base their judgments.*

To accomplish NRC's mission, the staff administers several regulatory programs. The programs encompass power, research, test, and training reactors; fuel cycle facilities; the use of radionuclides in medicine, research, and industry; and low-level and high-level radioactive waste facilities. Each of these regulatory programs was developed in response to legislative mandate.

2 LEGISLATIVE MANDATE

2.1 Atomic Energy Act of 1954 as Amended

In the United States, the commercial use of nuclear energy came about with the passage of the Atomic Energy Act (AEA) in 1954. At that time, NRC did not yet exist. The U.S. Atomic Energy Commission (AEC), created in 1946, had the responsibility of both promoting the growth of nuclear power and regulating its use. Section 1 of the AEA states,

> *"...Atomic energy is capable of application of peaceful as well as military purposes. It is therefore declared to be the policy of the United States that —*
>
> *a. the development, use, and control of atomic energy shall be directed so as to make the maximum contribution to the general welfare, subject at all times to the paramount objective of making the maximum contribution to the common defense and security; and*
>
> *b. the development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise."*

The basic legal standards for the process that NRC has today were set by the AEA of 1954. Specifically, that statute gave the public right to a hearing on certain agency actions, including applications for permits to construct and to operate nuclear power plants. Hearings were thought to be justified because the issuance of this type of license was a very significant action and, therefore, the public ought to be heard. (In the case of construction permits, hearings were mandatory even if no one asked for a hearing.) Also, hearings both informed the public and built public acceptance of the final decision.

Those were procedural requirements and were set by the U.S. Congress. On many issues, including the central question of "how safe is safe enough," the Atomic Energy Act did not

provide guidance. Nor could it. In 1954, the U.S. Congress was laying a foundation for regulating a technology that did not yet exist. The statutory mandate was extremely general: "protect health and safety," "minimize danger to life or property," and "provide adequate protection." Not unreasonably, the U.S. Congress left it to the Commission, the AEC and its successor, the NRC, to apply those terms and to give them practical meaning.

Over the decades, the NRC's approach to safety and safeguards has developed and matured: through regulations, adjudicatory decisions, and a variety of policies and practices. All of this has taken place under the eye of the U.S. Congress, which oversees the activities of Government agencies. In addition, periodic court decisions have shaped the NRC's interpretation of its responsibilities.

2.2 Government Reorganization

Over the years, as nuclear power changed from an experimental technology to an established source of electric power production, concern grew about the potential for conflict of interest when promotion and regulation were assigned to the same agency. In the 1960's and early 1970's, the rapid increase in the number of nuclear power plants also increased public concern over nuclear safety, waste disposal, and other related issues. Ultimately, there was a consensus that the nuclear power industry had outgrown the existing Governmental structures for its regulation.

By the early 1970's, public concern over the declining quality of the environment reached its peak. As a result, Congress took several actions. First, ***Reorganization Plan No. 3 of 1970*** was passed, which established the ***U.S. Environmental Protection Agency*** (EPA). Next, Congress passed the ***Energy Reorganization Act of 1974*** (PL 93-438) that split the former AEC into the ***Energy Research and Development Administration*** (ERDA) [later to be renamed the ***U.S. Department of Energy*** (DOE)] and the NRC. ERDA's mission was to perform research and development activities in support

of a national goal of energy independence, whereas NRC's mission was to have the regulatory authority of the AEC and licensing authority over certain ERDA facilities, including demonstration reactors and waste facilities. Finally, this Act required NRC to report abnormal occurrences (i.e., unscheduled incidents or events that NRC determines to be significant from the standpoint of public health or safety) to Congress. Most recently, the ***Federal Reports Elimination and Sunset Act of 1995*** (PL 104-66) requires that abnormal occurrences be reported to Congress on an annual basis.

2.3 Radioactive Waste Legislation

After nearly 35 years of uranium mining in the United States, Congress noted in the ***Uranium Mill Tailings Radiation Control Act*** (UMTRCA) of 1978 (PL 95-604), as amended, that

> *"...[U]ranium mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require that every reasonable effort be made to provide for the stabilization....of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings."*

By the 1980's, nuclear waste became a critical concern to the public and to the industries utilizing radioactive materials. In 1982, Congress passed the ***Nuclear Waste Policy Act*** (NWPA) (PL 97-425). This Act established the first of many schedules for siting and completing a repository for the final disposal of high-level radioactive waste. The ***Low-Level Radioactive Waste Policy Amendments Act of 1985*** (LLRW-PA) (PL 99-240) gave States the responsibility to dispose of LLRW generated within their borders and allowed them to form compacts to locate facilities to serve a group of States.

2.4 User Fees and Annual Charges

Since 1990, NRC has been required to recover approximately 100 percent of its budget by assessing fees. Congress is currently considering an extension to this requirement. Additionally, in recent Appropriations Acts, Congress has permitted NRC to perform certain limited activities that are not subject to fee recovery.

The NRC assesses two types of fees to recover its budget. First, NRC bills licensees and applicants for services rendered to an individual licensee or applicant. These services include things like inspections and review of applications for the issuance of licenses (new, amended, or renewal). Second, annual fees for each category of licensee are established every year to recover generic and other regulatory costs not recovered through fees for services.

2.5 Administrative Procedure Act

The ***Administrative Procedure Act*** (APA) establishes procedures that all regulatory agencies must follow to implement their regulatory programs. In addition to rules, statements of policy, and agency decisions, NRC must describe its organization and the general method by which functions are carried out. NRC currently maintains dozens of information systems, as defined in the APA, for which there are specific requirements, such as the occupational exposures database. The APA also establishes record requirements for licensees.

The APA specifies the process for publication of proposed and final rules in the *Federal Register*. But in addition to the rules themselves, agencies such as NRC are also required to make available to the public any documents developed to describe how compliance with those regulations will be evaluated by the staff. These guidance documents include regulatory guides, standard review plans, branch technical positions, and, in some cases, technical NRC or contractor documents. For each of these, the APA specifies that they must be published in draft in the *Federal Register* as proposed documents for public comment. With rare exception, after addressing all substantive

public comments, the agency publishes a final rule or guidance document. If an agency decides not to follow this process, it must notify Congress and justify the action. In addition, the ***U.S. Department of Justice*** notifies Congress of every instance in which an agency rule has been challenged in court, and the outcome of the challenge, if known.

The APA also establishes the requirements to hold meetings with the public. NRC publishes a notice of any planned public meeting in the *Federal Register*. The meeting may be transcribed. With very few exceptions, any meeting of a majority of Commissioners must also be open to the public. Also, any meeting held by either of the two Advisory Committees to the Commission (the Advisory Committee on Nuclear Waste, or the Advisory Committee on Reactor Safeguards) is also open to the public and noticed in the *Federal Register*.

Finally, the APA describes adjudication procedures and encourages agencies to use mediation and arbitration where practical to settle disputes.

2.6 National Environmental Policy Act

The ***National Environmental Policy Act*** of 1969 (NEPA) (PL 91-190) established a national policy which

> *"...encourages productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a* ***Council on Environmental Quality*** *(CEQ)."*

NEPA requires agencies to use a multidisciplinary approach to decision making and to consider all types of risks and benefits to both people and to the environment. The environmental impacts of agency decisions must always be considered and documented. This act requires that agencies with overlapping responsibility, such as NRC, DOE, and EPA, consult with one another before establishing possible requirements in those areas.

The CEQ is a body of three individuals, appointed by the President, and confirmed by the Senate, who as a result of training and experience, are exceptionally well-qualified to analyze and interpret environmental information and Federal activities. The CEQ advises the President on environmental issues, gathers information on trends, reviews agency activities in support of environmental quality, develops and recommends National policies to the President, and conducts research into and reports on the environmental quality of the United States and the world.

Part 51 in Title 10 of the *Code of Federal Regulations* outlines NRC's environmental protection regulations for implementing Section 102(2) of NEPA, as amended, that are applicable to NRC's domestic licensing and related regulatory functions.

3 NRC'S PRIMARY FUNCTIONS

NRC has three primary mechanisms for protecting the public's health, safety, and the environment from the use of NRC-licensed radioactive materials: licensing, inspection, and enforcement. The licensing process allows individuals, or companies, to use licensed material in accordance with NRC rules and policies. After analyzing the applicant's plan for conducting its licensed operations and determining that they are adequately safe and in accordance with NRC requirements, NRC issues a license to conduct specific operations utilizing radioactive materials. NRC then verifies that operations are indeed conducted in accordance with the application and any license conditions through a program of periodic inspections. If an inspection shows areas of noncompliance, enforcement actions can be implemented through fines, orders, or license termination. Finally, NRC provides Congress with annual reports containing information on abnormal occurrences, significant events, fees collected, agency expenditures, projected budgetary needs, and amendments to rules and policies.

The NRC is the Federal agency given the task of protecting public health and safety and the environment with regard to the safe use of nuclear materials and adheres to the following Principles of Good Regulation:

> ***Independence.*** *Nothing but the highest possible standards of ethical performance and professionalism should influence regulation. All available facts and opinions must be sought openly from licensees and other interested members of the public. The many and possibly conflicting public interests involved must be based on an objective, unbiased assessment of all information, and must be documented with reasons explicitly stated.*
>
> ***Openness.*** *Nuclear regulation is the public's business, and it must be transacted publicly and candidly. The public must be informed about and have the opportunity to participate in the regulatory process as required by law. Open*

channels of communication must be maintained with Congress, other government agencies, licensees, and the public, as well as with the international nuclear community.

Efficiency. *The American taxpayer, the rate-paying consumer, and licensees are entitled to the best possible management and administration of regulatory activities. The highest technical and managerial competence is required, and must be a constant agency goal. NRC must establish means to evaluate and continually upgrade its regulatory capabilities. Regulatory activities should be consistent with the degree of risk reduction they achieve. When several effective alternatives are available, the option which minimizes the use of resources should be adopted. Regulatory decisions should be made without undue delay.*

Clarity. *Regulations should be coherent, logical, and practical. There should be a clear nexus between regulations and agency goals and objectives whether explicitly or implicitly stated. Agency positions should be readily understood and easily applied.*

Reliability. *Regulations should be based on the best available knowledge from research and operational experience. Systems interaction, technological uncertainties, and the diversity of licensees and regulatory activities must all be taken into account so that risks are maintained at an acceptably low level. Once established, regulation should be perceived to be reliable and not unjustifiably in a state of transition. Regulatory actions should always be fully consistent with written regulations and should be promptly, fairly, and decisively administered so as to lend stability to the nuclear operational and planning processes.*

The Office of the Chairman, the Commission, and Program Offices

The NRC is headed by five ***Commissioners*** appointed by the President and confirmed by the Senate for 5-year terms. One of them is designated by the President to be ***Chairman***, serving as the principal executive officer and official spokesperson of the Commission. The ***Executive Director for Operations*** is the chief operational and administrative officer and carries out the policies and decisions made by the Commission. The NRC's offices are—

- ***Nuclear Reactor Regulation***
- ***Nuclear Material Safety and Safeguards***
- ***Nuclear Regulatory Research***
- ***Regional Offices***
- ***State and Tribal Programs***
- ***Enforcement***
- ***Incident Response Organization***

NRC has authority over source, byproduct, and special nuclear material. ***Title 10 of the Code of Federal Regulations*** (10 CFR) defines these terms as follows:

> ***Source Material*** *means (1) uranium and/or thorium in any physical or chemical form; or (2) ores that contain, by weight, one-twentieth of 1 percent (0.05 percent), or more, of uranium and/or thorium, or any combination of uranium and thorium. Source material does not include special nuclear material.*
>
> ***Special Nuclear Material*** *means (1) plutonium, uranium-233 (U-233), uranium enriched in the isotope 233 or 235, and any other material that the Commission, pursuant to the provisions of Section 51 of the Act, determines to be special nuclear material, but does not include source material or (2) any material artificially enriched by any of the forgoing but does not include source material.*

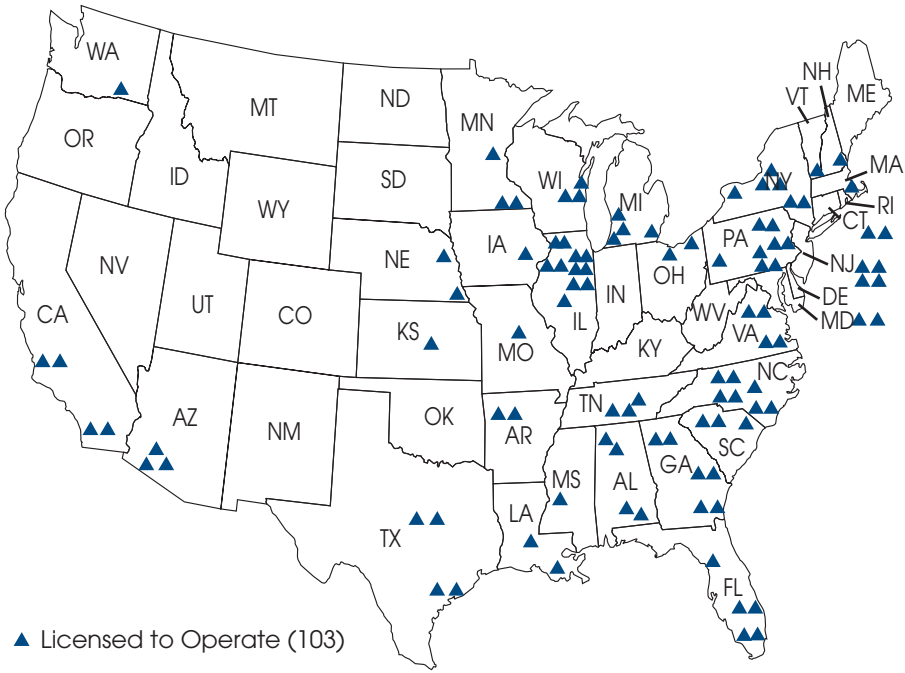
Byproduct Material *means (1) any radioactive material (except special nuclear material) yielded in, or made radioactive, by exposure to radiation incident to the process of producing or utilizing special nuclear material; and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition.*

Appendix A provides a listing of each of the Parts of Title 10 of the CFR that are applicable to the NRC.

4 REACTOR OVERSIGHT PROGRAM

The NRC's ***Office of Nuclear Reactor Regulation*** (NRR) oversees the licensing and inspection of the Nation's nuclear power and research reactors. There are currently 103 commercial nuclear power reactors licensed to operate in 32 States (see Figure 1). The NRC does not regulate reactors operated by the DOE that furnish fissionable materials for use in nuclear weapons.

Figure 1. U.S. Commercial Nuclear Power Reactors



Note: There are no commercial reactors in Alaska or Hawaii.
Source: Nuclear Regulatory Commission

NRR develops policy and inspection guidance for the regional offices and assesses them to ensure those programs are uniform and effective. NRR also performs reviews, certification, and licensing of future nuclear reactor facilities and the amendment to, or renewal of, current power reactor operating licenses. In the course of these activities, NRR identifies conditions and licensee performance that may adversely affect public health and safety, the environment, or the safeguarding of nuclear facilities. When such conditions exist, including incidents and accidents, NRR coordinates with the responsible regional offices and takes action. In addition, NRR assesses licensing issues and regulatory policies concerning reactor operators (including the initial licensing examination and requalification examinations); emergency preparedness (including participation in emergency drills with Federal, State, and local agencies); radiation protection; facility security and safeguards (including fitness for duty); and inspection of nuclear component supplier facilities.

4.1 Nuclear Reactor Licensing Process

As mentioned earlier, NRC is responsible for, among other things, regulating the licensing and operation of nuclear power plants. In the past, nuclear power plants were licensed under a two-step licensing process under 10 CFR Part 50. This process requires both a construction permit and an operating license. The new 10 CFR Part 52 provides an alternative licensing process that combines a construction permit and an operating license, with conditions, into one license. In either process, before a nuclear power plant can be built and operated, approval must be obtained from the NRC.

In order to receive NRC approval to construct or operate a nuclear power plant, an applicant must submit a ***Safety Analysis Report*** (SAR). The SAR presents the design criteria and design information for the proposed reactor and includes comprehensive data on the proposed site. The SAR also discusses various hypothetical accident situations and the safety features that are provided to prevent accidents or, in the unlikely event that they do occur, to mitigate their effects on both the public and the facility's employees. In addition, the

application must contain a comprehensive Environmental Report evaluating the environmental impact of the proposed plant. Further, information must be submitted on the antitrust aspects of the proposed plant.

When an application to construct a nuclear power plant is received, the NRC staff determines whether it contains sufficient information to satisfy the Commission requirements for a detailed technical review. After the application is accepted for review, the NRC staff holds a general introductory meeting in the area of the proposed site in order to familiarize the public with the safety and environmental aspects of the proposed application, including the planned location, the type of plant proposed, and the provisions for public participation in the licensing process. Numerous public meetings of this type are held during the course of the reactor licensing process. Also, a press release announcing receipt of the application is issued by NRC and copies are sent to Federal, State, and local officials and, usually, the local news media indicating that a notice of receipt of the application is published in the *Federal Register*.

The NRC staff reviews the application based upon criteria presented in standard review plans to determine whether the plant design meets the Commission's regulations (10 CFR Parts 20, 50, 73, and 100). The NRC staff's review includes, in part, the characteristics of the site, including its surrounding population, seismology, meteorology, geology and hydrology; the nuclear plant design; the anticipated response of the plant to postulated accidents; the plant operations, including the applicant's technical qualifications to operate the plant; radiological releases; and emergency planning. When the staff completes its review and evaluation, a ***Safety Evaluation Report*** (SER) is prepared. This report summarizes the staff's review related to the anticipated effect of the proposed facility on public health and safety.

The ***Advisory Committee on Reactor Safeguards*** (ACRS), an independent statutory committee established to provide advice to the NRC on reactor safety, reviews each application to construct or operate a nuclear power plant. The ACRS is kept informed of the review process. Historically, the ACRS review begins early in the licensing process by selecting

appropriate stages in the review to begin a series of meetings with the applicant and the NRC staff. When the Committee has completed its review, its report is submitted to the Commission by a letter to the Chairman of the NRC.

Also, an environmental review is performed by the NRC staff in accordance with the ***National Environmental Policy Act*** (NEPA) to evaluate the potential environmental impacts and benefits of the proposed plant (see 10 CFR Part 51). After completion of this review, a ***Draft Environmental Impact Statement*** (DEIS) is issued for comment by the appropriate Federal, State, and local agencies as well as by the public. Then a ***Final Environmental Impact Statement*** (FEIS) is issued and made public. All comments that are received are addressed in the document.

NRC requires that a public hearing be held before a construction permit, early site permit, or a combined license may be issued for a nuclear power plant. The public hearing is conducted by the ***Atomic Safety and Licensing Board*** (ASLB). The ASLB is composed of one lawyer, who acts as chairperson, and two technically qualified persons. Members of the public may submit written or oral statements to the licensing board to be entered into the hearing record or they may petition for leave to intervene as full parties in the hearing.

At some point after a construction permit is issued under 10 CFR Part 50, the applicant must, if not part of the original application, submit the ***Final Safety Analysis Report*** (FSAR) in support of an application for an operating license. The FSAR describes the details on the final design of the facility. The FSAR also provides plans for operation and emergency preparedness.

Again the staff reviews the information in detail. Amendments to the application and reports may be submitted periodically. The staff prepares a ***Final Safety Evaluation Report*** for the operating license and, as during the construction permit stage, the ACRS makes an independent evaluation and presents its advice to the Commission. A public hearing on the operating license is not mandatory or automatic. However, soon after accepting the operating license application, the

Commission announces this action in a *Federal Register* notice. The notice provides that any person whose interest might be affected by the proceeding may petition the NRC for a hearing. If a public hearing is held, the same decision process described for the construction permit hearing applies.

A combined license, issued under Subpart C of 10 CFR Part 52, authorizes construction of the facility in a manner similar to a construction permit under 10 CFR Part 50. However, the combined license specifies the inspections, tests, and analyses that the licensee must perform as well as the acceptance criteria that, if met, are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will be operated in conformance with the license and the applicable regulations. After issuing the combined license, the Commission verifies that the required inspections, tests, and analyses were performed and, before operation of the facility, finds that the acceptance criteria were met. Periodically, during construction, the NRC staff will publish notices of the successful completion of inspections, tests, and analyses in the *Federal Register*. A notice of intended operation of the facility is published in the *Federal Register* at least 180 days before the date scheduled for initial loading of fuel. There is an opportunity for hearing following construction, but petitions for a hearing will only be considered if the petitioner demonstrates that the acceptance criteria have not been met. Before the plant can operate, the Commission must determine that the acceptance criteria were met.

In both licensing processes (10 CFR Parts 50 and 52), the NRC monitors construction and initial operation of a facility to ensure compliance with the Commission's regulations for the protection of public health and safety and the environment. The licensing process under 10 CFR Part 52 also provides for ***Early Site Permits*** (Subpart A), and ***Standard Design Certifications*** (Subpart B).

An ***early site permit*** provides for resolution of site safety, environmental protection, and emergency preparedness issues, independent of a specific nuclear plant review. The early site permit application must address the safety and environmental characteristics of the site and evaluate potential physical

impediments to the development of an emergency plan. The staff's findings on site safety characteristics and emergency planning are documented in an SER and on environmental protection issues in draft and final environmental statements. After the NRC staff and the ACRS complete their safety reviews, the NRC issues a notice for a mandatory public hearing. The early site permit is valid for no less than 10 and no more than 20 years and can be renewed for 10 to 20 years.

A ***standard plant design*** may be certified and approved by the NRC through a rulemaking, without a specific site in mind. The design certification is valid for 15 years. The issues that are resolved in a design certification have a more restrictive ***backfit*** requirement than issues that are resolved under other licenses. That is, a certified design cannot be modified by the NRC unless the modification is necessary to meet the applicable regulations in effect at the time of the design certification or to ensure adequate protection of the public health and safety. An application for a combined license under 10 CFR Part 52 can incorporate by reference a design certification and/or an early site permit. The advantage of this approach is that the issues resolved by the design certification rulemaking process and those resolved during the early site permit hearing process cannot be re-visited at the combined license stage. Currently, NRC has certified, through rulemaking, three new advanced designs: the General Electric Advanced Boiling Water Reactor, the Asea Brown Boveri-Combustion Engineering System 80+, and the Westinghouse AP600.

4.2 Inspecting the Nuclear Power Plant

The primary safety consideration in the operation of any nuclear reactor is to control and contain radioactive material under both normal and accident conditions. Numerous controls and barriers are installed in reactors to protect workers and the public from the effects of radiation. Both the industry and the NRC provide these protections and ensure that they are maintained. The NRC establishes regulations and guides for the construction and operation of nuclear reactors. Organizations licensed by the NRC must abide by these regulations and are

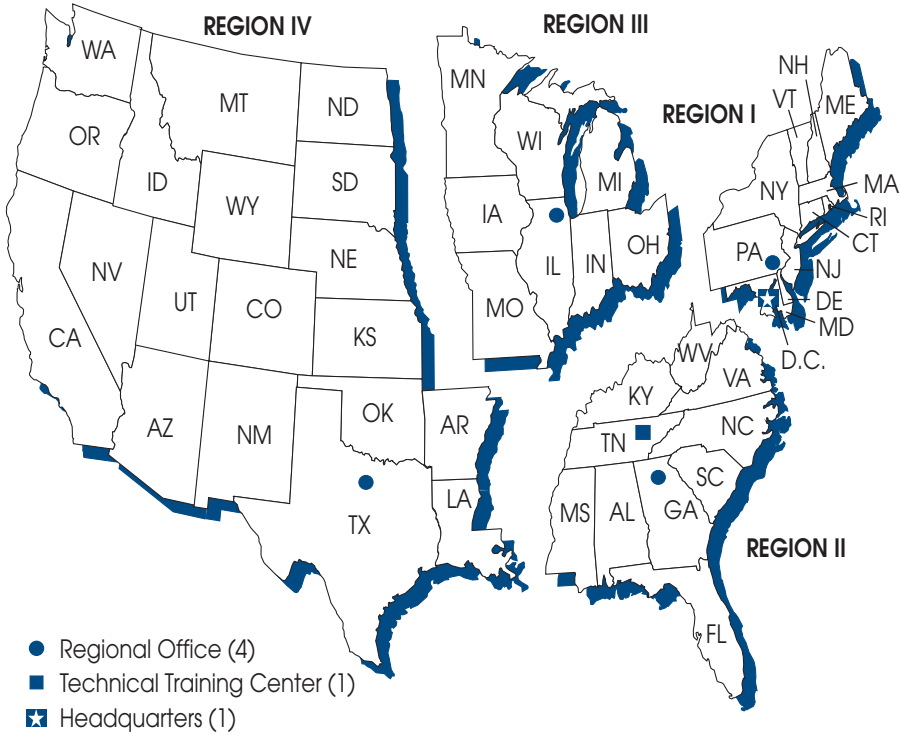
directly responsible for designing, constructing, testing, and operating their facilities in a safe manner.

The NRC inspection program verifies, through scrutiny of carefully selected samples, that activities are properly conducted and equipment properly maintained to ensure safe operations. The staff determines which items to sample, as well as the sample sizes and inspection frequencies, based on the importance of the activity or system to overall safety. The inspection process monitors the licensee's activities and provides feedback to the licensee's management for appropriate corrective action. However, the NRC inspection program does not replace the licensee's programs or reduce its responsibilities.

Inspections are performed on power reactors under construction, in test conditions, and in operation. The inspections are conducted primarily by ***region-based*** and ***resident inspectors.*** An onsite resident inspector provides a continual inspection and regulatory presence, and direct contact between NRC management and the licensee. The activity of the resident inspector is supplemented by the work of engineers and specialists from the Regional Office who perform inspections in a wide variety of engineering and scientific disciplines, ranging from civil and structural engineering to health physics and reactor core physics. Region-based inspectors operate out of the four Regional Offices located in or near Philadelphia, Atlanta, Chicago, and Dallas (see Figure 2). These programs are supplemented by personnel from NRC Headquarters. Inspections are a vital part of the NRC's review of applications for licenses and issuance of construction permits and operating licenses. Inspections continue throughout the operating lifecycle of a nuclear facility.

About six months before the operating license is issued, the licensee begins a startup phase to prepare for fuel loading and "power ascension." After issuance of the operating license, fuel is loaded into the reactor, and the startup test program begins. As in pre-operational testing, NRC inspections emphasize test procedures and results. Inspectors appraise the licensee's management system for startup testing, analyze test procedures, witness tests, and review licensee evaluations of

Figure 2. NRC Regions



Note: There are no commercial reactors in Alaska or Hawaii.
Source: Nuclear Regulatory Commission

test results. Thereafter, the NRC continues its inspection program for the remainder of the operating life of the plant.

The ***NRC Inspection Manual*** defines the frequency, scope, and depth of the inspection program for operating reactors and provides instructions and guidance for NRC inspectors. The program is structured to ensure that the resources available for inspection are used efficiently and effectively, with particular attention accorded to those plants where past performance indicates the need to improve the levels of protection and safety-consciousness. NRC's inspection program is

designed to ensure that nuclear power plants are constructed and operated safely and that they comply with regulatory requirements. When a safety problem or a failure to comply with requirements is discovered, the NRC requires that prompt corrective action by the licensee be confirmed.

The NRC periodically assesses its inspection program to evaluate its effectiveness in achieving its regulatory objectives and in April 2000 implemented a revised reactor oversite program.

4.3 License Renewal

In accordance with the Atomic Energy Act, the Nuclear Regulatory Commission (NRC) issues licenses for commercial power reactors to operate for up to 40 years. These licenses can be renewed for up to 20 additional years. A 40-year license term was selected on the basis of economic and antitrust considerations—not by technical limitations. However, individual plant designs may have been engineered on the basis of an expected 40-year service life.

The NRC has established a timely license renewal process and clear requirements that are needed to ensure safe plant operation for extended plant life. Renewal of licenses undoubtedly will affect whether nuclear power will remain part of the energy supply mix for the nation during the first half of the 21st century.

In 1991, the NRC published the license renewal rule in 10 CFR Part 54. In 1995, the NRC amended the license renewal rule. The amended Part 54 established a regulatory process that is simpler, more stable, and more predictable than the previous license renewal rule. In particular, Part 54 was clarified to focus on managing the adverse effects of aging rather than identification of all aging mechanisms.

The license renewal process proceeds along two tracks—a technical review of safety issues and an environmental review. The applicant has to provide NRC an evaluation that addresses the technical aspects of plant aging and describes the ways those effects will be managed. It must also prepare an evaluation of

the potential impact the plant might have on the surrounding environment if it operates for another 20 years. The NRC reviews the application and verifies the safety evaluations through inspections.

A nuclear power plant licensee may apply to the NRC to renew its license as early as 20 years or as late as 5 years before expiration of its current license. License renewal is expected to take less than 3 years, including the time to conduct an adjudicatory hearing, if necessary. The license renewal process proceeds along two tracks—a technical review of safety issues and an environmental review. As previously described, the requirements for these reviews are contained in NRC regulations, 10 CFR Parts 54 and 51, respectively. The applicant has to provide NRC an evaluation that addresses the technical aspects of plant aging and describes the ways those effects will be managed. It must also prepare an evaluation of the potential impact the plant might have on the surrounding environment if it operates for another 20 years. The NRC reviews the application and verifies the safety evaluations through inspections.

Public participation is an important part of the license renewal process. There are several opportunities for members of the public to raise questions regarding whether effects of aging will be adequately managed for the period of extended operation. Information provided by the licensee is made available to the public. Several public meetings are held, and NRC evaluations, findings, and recommendations are published when completed. Concerns may be litigated in a formal adjudicatory hearing if any party that would be adversely affected requests a hearing. In addition, members of the public may petition the Commission for consideration of issues other than the management of the effects of aging during the period of extended operation of the plant.

In 1996, the NRC developed a draft regulatory guide for the format and content of the safety aspects of a license renewal application. This guide proposes to endorse an implementation guideline prepared by the Nuclear Energy Institute (NEI) as an acceptable method of implementing the license renewal rule. The NRC prepared a draft standard review plan for the safety review which was made available in the Public Document Room in

September 1997. The draft regulatory guide will be used along with the draft standard review plan to assess technical issue reports involved in license renewal as submitted by industry groups. As experience is gained, NRC will improve the standard review plan and clarify regulatory guidance.

4.4 Nuclear Power Plant Decommissioning

Throughout 1995 and 1996, the NRC staff revised regulations to make them clearer and changed the decommissioning policy for permanently shutdown reactors. July 20, 1995, the Commission issued a "Notice of Proposed Rulemaking on Decommissioning of Nuclear Power Plants." On July 2, 1996, the Commission approved the final rule. The rule was published in the *Federal Register* on July 29 and became effective on August 28, 1996. The final rule —

- redefines the decommissioning process,
- defines terminology related to decommissioning,
- requires licensees to provide the NRC with early notification of planned decommissioning activities at their facilities, and
- establishes explicit requirements for permanently shutdown reactors.

The Commission believes the amendments improve efficiency and uniformity in the decommissioning process for nuclear power reactors. The amendments allow for public participation in the decommissioning process and provide the public with a better understanding of the process as the reactor facility transitions from an operating to a decommissioning mode.

When NRC receives a confirmation from a licensee, their authority to operate the reactor or to load fuel into the reactor vessel will be withdrawn by amending the license. This measure entitles the licensee to an annual fee reduction and would eliminate the obligation to adhere to certain requirements that apply only during reactor operation. Within 2 years after submitting the certification of permanent cessation of operations,

the licensee submits a ***post-shutdown decommissioning activities report*** (PSDAR) to the NRC. This report provides a description of the licensee's planned decommissioning activities, a schedule for accomplishing them, and the estimated costs.

In the PSDAR, the licensee also discusses the reasons for concluding that environmental impacts associated with the site-specific decommissioning activities have already been considered in previous reports. If not previously considered, the licensee would have to request a license amendment for approval of the activities and submit an environmental report on the additional impacts.

After receiving a PSDAR, the NRC publishes a notice of receipt, makes the PSDAR available for public review and comment, and holds a public meeting in the vicinity of the plant to discuss the licensee's intentions. Ninety days after the NRC receives the PSDAR, and generally 30 days after the public meeting, the licensee could begin to perform major decommissioning activities without specific NRC approval. These activities could include permanent removal of major components such as the reactor vessel, steam generators, large piping systems, pumps, and valves.

The final regulations state that decommissioning activities conducted without specific prior NRC approval must not —

- foreclose release of the site for possible unrestricted use,
- result in there being no reasonable assurance that adequate funds will be available for decommissioning, or
- cause any significant environmental impact not previously reviewed.

If any decommissioning activity could not meet these terms, the licensee is required to submit a license amendment request, which provides an opportunity for a public hearing.

5 MATERIALS OVERSIGHT PROGRAM

The NRC's ***Office of Nuclear Material Safety and Safeguards*** (NMSS) and the four Regional Offices regulate the safe use of nuclear materials under several broad programs: (1) industrial and medical material safety; (2) fuel cycle safety and safeguards; (3) waste management; and (4) spent fuel storage, transportation, and disposal. Licensees may apply for any one of several different types of NRC licenses, depending on the type and application of the use of radioactive material:

Exempt Licenses. *Any person may possess, use, receive, transfer, own or acquire byproduct material in individual quantities each of which does not exceed the applicable quantity (i.e., exempt quantity) in 10 CFR 30.71, Schedule B. Examples of exempt licenses are for smoke detectors, gun sights, and watches that use small quantities of radioactive material to power or illuminate a device.*

General Licenses. *Part 31 of title 10 of the CFR provides information about generally licensed devices. Commercial and industrial firms, research, educational and medical institutions, individuals, or Federal, State or local government agencies may acquire, receive, possess, or transfer generally licensed devices. Such devices are designed and manufactured for detecting, measuring, gauging or controlling thicknesses, densities, levels, radiation leakage, or chemical composition. Any person who acquires, receives, possesses, uses, or transfers a generally licensed device must maintain labels; perform required leak tests; ensure that label instructions are followed; maintain records of compliance with these requirements; notify the manufacturer and NRC or the Agreement State of any device failure, damage, loss, or theft; not abandon or export the device; and transfer the device only in accordance with specific restrictions.*

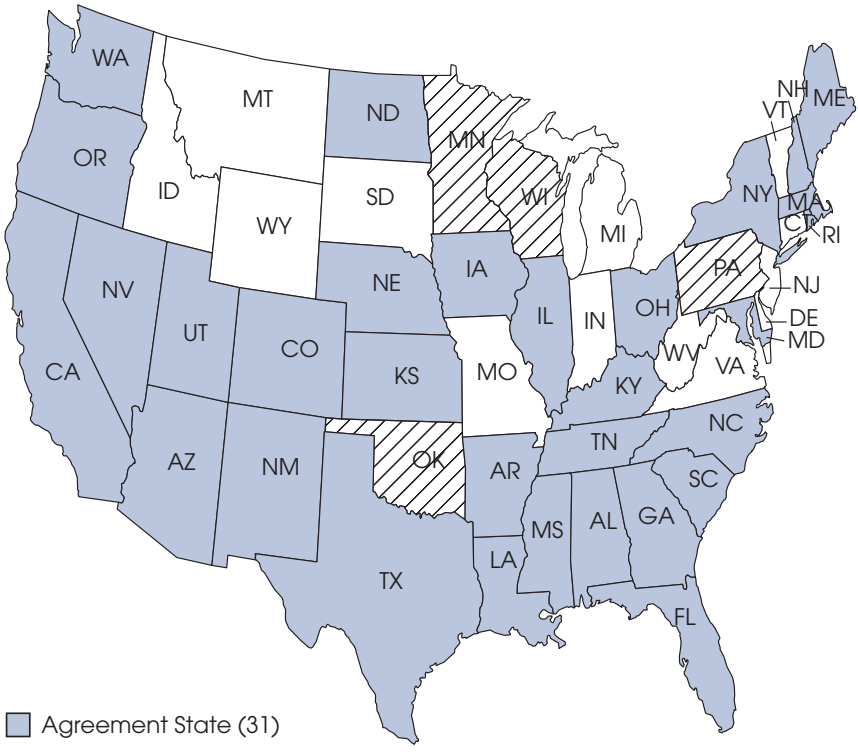
Specific Licenses *may include a license for any device containing radioactive material that is not generally licensed or*

exempt, such as source, byproduct, or special nuclear material. That could be because the device does not meet the requirements for a generally licensed device, contains unsealed sources, or just because the manufacturer did not request that the device be reviewed for applicability of general license provisions. Types of specific licenses can be issued to individuals, manufacturers, or for broad-scope applications such as academic or research institutions.

The ***NRC Regional Offices*** administer almost all NRC materials licenses with the exception of exempt distribution licenses, sealed source and device reviews, and licenses for companies that extract other metals from ores and slags containing uranium and thorium. These licenses, along with the fuel cycle licensing are handled at NRC Headquarters located in Rockville, Maryland. NRC issues approximately 3,000 new, renewal, or license amendments for material licenses and conducts approximately 1,500 health and safety inspections of its nuclear material licenses annually.

Approximately 21,000 licenses are in place in the United States for medical, academic, and industrial uses of nuclear material. Of these, 5,300 licenses are administered by NRC, whereas the rest are administered by the 31 Agreement States. An Agreement State is one that has signed an agreement with the NRC to assume authority to regulate the use of byproduct radioactive material (byproduct radioactive material that results from the production or the use of plutonium or uranium). When a State decides to enter into such an agreement with NRC, they must demonstrate that its program is adequate to protect public health and safety and that it is compatible with the NRC materials program. The NRC reviews the states proposed regulations to determine if they meet NRC requirements. NRC also periodically reviews Agreement State policies and procedures. NRC works closely with the State to ensure that regulations, staffing, training, and experience requirements for State staff are appropriate and that funding of the program is adequate. Four additional States, Oklahoma, Minnesota, Wisconsin, and Pennsylvania, are actively working toward becoming Agreement States. Figure 3 identifies the States that are currently Agreement States.

Figure 3. NRC Agreement States



Note: Data as of 7/99 Alaska and Hawaii are not Agreement States.
Source: Nuclear Regulatory Commission

5.1 Medical Uses

Medical uses of radioactive materials fall broadly into two categories: diagnostic and therapeutic. ***Diagnostic*** procedures using radiation are classified as either radiology (sources used external to the body) or nuclear medicine (sources internal to the body). Both involve the use of relatively small amounts of radioactive materials to facilitate imaging of a suspected medical problem. For the most part, radiology is the use of x-ray machines regulated by the States. Two examples of nuclear

medicine are the use of technetium-99m in the diagnosis of bone or heart organ problems and radioactive iodine in imaging of the thyroid gland. Both allow physicians to locate and identify tumors, size anomalies, or other problems.

Therapeutic uses of radioactive materials include teletherapy, brachytherapy, and therapeutic nuclear medicine. The purpose of all three is to kill cancerous tissue, reduce the size of a tumor, or reduce pain. In teletherapy, an intense beam of radiation is focused on the tissue. An example of teletherapy is the use of the *Gamma Knife*, which uses a collimating helmet to focus gamma rays from cobalt-60 sources to a specific location deep within brain tissue. In brachytherapy, a smaller source is placed close to, or within, cancerous tissue where the tumor is easily accessible, such as in breast, prostate, or cervical cancers. In therapeutic nuclear medicine, high doses of radioactive isotopes are injected into, or ingested by, the patient. One example is the use of radioactive iodine, which accumulates in the thyroid gland, sufficient to destroy or shrink a diseased thyroid.

Regulatory authority over the uses of ionizing radiation in medicine is shared among several government agencies at the Federal, State, and local levels. An estimated 10 million annual diagnostic and therapeutic clinical procedures use radioactive material, of which approximately 250,000 are therapeutic. NRC (or the Agreement State) has regulatory authority over the use of byproduct materials in medicine. The ***Food and Drug Administration*** (FDA) oversees the approval of radiation-producing machines and radiopharmaceuticals. The States administer the use of radiation-producing machines such as x-ray machines and accelerators.

The NRC oversees medical uses through licensing, inspection, investigation, and enforcement programs. The NRC issues licenses to facilities, authorizes physician users, develops appropriate regulations and guidance for use by licensees, and maintains a committee of medical experts to obtain advice in the uses of byproduct materials in medicine. The ***Advisory Committee on the Medical Uses of Isotopes*** meets twice a year to be briefed by, and provide advice to, the staff on current

initiatives in medical uses of radioactive materials. The committee consists of physicians specializing in all areas of diagnostic and therapeutic medical uses of byproduct materials, a nuclear pharmacist, a medical physicist, a patient advocate, a health care administrator, and a radiation safety officer.

5.2 Industrial Uses

NRC regulates many different types of industrial applications, only a few of which will be mentioned here.

5.2.1 Sealed Sources and Devices. Manufacturers and distributors of radiation sources and devices containing radiation sources are required to submit safety information about their products and their quality assurance (QA) programs to the NRC or to the Agreement State by which they are licensed. The regulatory agency evaluates the information provided to ensure that each product is adequately designed to protect public health and safety and to meet all applicable radiation safety requirements. The agency then issues a ***registration certificate*** to the vendor of the device. The registration certificate is used by the NRC or the Agreement State to issue specific licenses to users of the products.

The NRC maintains a nationwide registry of NRC and Agreement State registration certificates. The registry consists of a hard-copy file system of all registration certificates, two database systems that contain the information commonly found on the first page of the registration certificate, and background files for the registration certificates generated by the NRC. NRC also tracks this information for administrative purposes.

The NRC examines products containing radioactive material for which safety evaluations have been performed. As needed, NRC has contracts to test products to see if they perform as intended and are adequate to protect public health and safety. In addition, the contractor inspects products for known or suspected design defects. Information from these contracted tasks has been used to support incident investigations and rulemaking for NRC and for Agreement States.

5.2.2 Industrial Radiography. Radiography is the use of radiation to produce an image of internal features on photographic film. The principal components of a gamma radiography system are the radioactive source assembly, the radiographic exposure device, and the control unit. The radioactive material used as the source of radiation in a gamma radiography system is usually iridium-192 or cobalt-60 encased in a source capsule. The source capsule is made from stainless steel and is welded to form a hermetic (airtight, liquid tight) seal. This containment prevents the dispersion of radioactive contamination.

Current requirements in 10 CFR Part 34 for industrial radiography, revised in October 1996, require two radiographic personnel to be present when performing industrial radiography at temporary job sites. In addition, radiographers are required to be certified. Certified radiographers and radiography assistants must complete specific training requirements.

5.2.3 Irradiators. An irradiator is a device or a facility that exposes products to radiation to sterilize them. Examples of products sterilized in an irradiator include spices, milk containers, and hospital supplies. Since the 1950s, irradiation has been used for medicine, industry, and research. NRC regulates the use of sealed gamma sources in irradiators used to irradiate objects or materials. Electron irradiators (such as linear accelerators) are currently regulated by the States. The regulations in 10 CFR Part 36 apply to panoramic irradiators that have either dry or wet storage of the radioactive sealed sources and to underwater irradiators in which both the sources and the product being irradiated are under water.

5.2.4 Well-Logging. Well logging is a valuable technique used in several industries today. Well logging uses a portable laboratory, truck-mounted for land use and permanently mounted on an offshore drilling platform. Well loggers lower a device called a logging tool into the oil or gas well to measure the properties of the formation through which they pass, indicating the presence or absence of oil or gas.

NRC and the Agreement States regulate the use of radioactive materials, including sealed sources, radioactive tracers, radioactive markers, and uranium sinker bars in well logging.

The regulations in 10 CFR Part 39 prescribe the radiation safety requirements as well as specific licensing requirements for persons using licensed materials in these operations.

5.2.5 Gauging Devices. Radioisotopes in gauges are used to monitor and control the thickness of sheet metal, textiles, paper napkins, newspaper, plastics, and photographic film as they are manufactured. Portable gauges are typically used to test the structural integrity of roads and bridges, whereas fixed gauges, for example, are used to measure amounts of liquids in canned beverages, air whipped into ice cream, or tobacco packaged into a cigarette. NRC and the Agreement States also regulate the use of fixed and portable gauging devices. The use of these gauges is widespread in industries such as agriculture and construction.

5.3 Fuel Cycle Safety and Safeguards

NRC licenses and inspects all commercial nuclear fuel facilities (with the exception of certain mining operations) involved in the recovery, processing, and fabrication of uranium ore into reactor fuel. Ten major fuel cycle facilities are licensed to operate in nine States (see Figure 4). The uranium fuel cycle includes obtaining, purifying, enriching, and fabricating uranium fuel for reactors; the use of uranium fuel in reactors; and the storage, reprocessing, transportation, and disposal of spent fuel. This section covers only the "front end" of the fuel cycle, that is those steps involving fabricating new fuel for use in reactors. The "back end" of the fuel cycle, spent fuel storage, transportation, and disposal, is covered in Section 5.4 and 5.5 "Spent Fuel Programs" and " Waste Management."

There are four types of potential hazards at fuel cycle facilities: (1) criticality; (2) chemical; (3) radiological; and (4) fire or explosion. NRC requirements address each of these hazards from the various fuel cycle operations.

5.3.1 Uranium Mining. The major domestic deposits of uranium ores are found in the western United States. Historically, most uranium ore has been mined in Arizona, Colorado, New Mexico, Texas, Utah, Washington, and

Figure 4. Major U.S. Fuel Cycle Facility Sites

Note: There are no fuel cycle facilities in Alaska and Hawaii.
Source: Nuclear Regulatory Commission

Wyoming. Smaller quantities have been produced in California, Idaho, Montana, Nebraska, Nevada, North Dakota, Oregon, and South Dakota. Until 1975, import restrictions essentially prevented the importation of uranium from outside the United States. These restrictions were gradually removed between 1975 and 1985, resulting in a steady increase in uranium imports from countries having higher-grade uranium deposits. By 1986, imports provided about 44 percent of the U.S. requirement for uranium. The principal sources have been Canada,

South Africa, and Australia. In recent years, ***highly enriched uranium*** (HEU) from Russian imports and U.S. disarmament activities have been significant sources of uranium.

There are basically four types of uranium mines: open pits; room and pillar mines; vein structure mines; and breccia pipe mines. ***In situ leaching*** (ISL) facilities are another means of extracting uranium from underground. All but the ISL facilities are regulated by the Department of the Interior and the States. ISL's involve excavating huge quantities of uranium-rich ores suitable for uranium extraction. ISL mining is used to recover uranium from low grade ores that may not be economically recoverable by other methods. In this process a leaching agent is injected through wells into the ore body to dissolve the uranium. The leach solution is pumped from the formation, and ion exchange is used to separate the uranium and the solution for reuse.

5.3.2 Uranium Milling. Uranium mills extract uranium from ores and recover it in a concentrated form. Generally, 90 to 95 percent of the uranium is extracted from the ore, resulting in a purified form of uranium concentrate called yellowcake. Mills are typically located in areas of low population density, and they process ores from mines within about 50 kilometers (30 miles) of the mill.

The NRC requirements at uranium mills control industrial hazards and address waste and decommissioning concerns. Because this mined material is not enriched, no criticality hazard and very little fire or explosive hazard exists. Radiological hazards are minimal at these facilities as uranium bearing soil has little penetrating radiation and only moderate non-penetrating radiation. The chemical toxicity of the uranium is a greater concern.

The hazards associated with milling are similar to those of mining, that is, chemical toxicity. The primary radiological hazard associated with milling is due to the presence of radium in the uranium decay chains and the production of radon and radon daughters. The ***mill tailings***, which contain most of the progeny of uranium, are a significant source of radon and radon daughter releases to the environment.

5.3.3 Uranium Conversion. After the yellowcake is produced at the mill, the next step is conversion into pure ***uranium hexafluoride*** (UF_6) gas suitable for use in enrichment operations. UF_6 is the only uranium compound that exists as a gas at a suitable temperature.

One conversion plant is operating in the United States, Allied-Signal Inc., which is located in Metropolis, Illinois. Other countries that have conversion plants are Canada, France, the United Kingdom, and the New Independent States of the Former Soviet Union.

As with mining and milling, the primary risks associated with conversion are chemical and radiological. Strong acids and alkalis are used in the conversion process, which involves converting the ore to very soluble forms, leading to possible intakes of uranium. In addition, conversion produces extremely caustic chemicals which could cause fire and explosion hazards.

5.3.4 Uranium Enrichment. NRC regulates both ***gaseous diffusion enrichment facilities*** in the United States. They are leased by the United States Enrichment Corporation from DOE as sites that have been designed and constructed to DOE specifications. NRC does not license the plants, but issues a certificate of compliance. NRC promulgated regulations for the gaseous diffusion plants in 10 CFR Part 76 in September 1994. The two plants, located in Paducah, Kentucky, and Portsmouth, Ohio, came under NRC regulation on March 4, 1997.

Gaseous diffusion is used to enrich uranium to a concentration suitable for use as reactor fuel. Heated UF_6 is fed into a series of thousands of diffusion stages. In each stage, pressurized UF_6 gas is pushed through a diffusion membrane that permits slightly more U-235 than U-238 to pass through the membrane. A fractional increase in U-235 enrichment is achieved in each stage. Hazards in enrichment facilities include all of the chemical and radiological issues of conversion facilities, plus the potential for a criticality accident.

NRC staff perform numerous safety and safeguards assessments at these plants every year. Pursuant to the Energy

Policy Act of 1992, NRC must issue an annual certificate of compliance if the plants meet those standards. NRC reports its findings to Congress annually.

5.3.5 Fuel Fabrication. This step involves the conversion of the gaseous UF_6, at the appropriate enrichment, to ***uranium dioxide*** (UO_2) powder. This powder is then converted to ceramic pellets, loaded into zircaloy tubes, and constructed into fuel assemblies. Fuel fabrication facilities licensed by NRC include the Framatome Cogema and BWX Technologies in Lynchburg, Virginia; ABB Combustion Engineering in Hematite, Missouri; General Electric in Wilmington, North Carolina; Nuclear Fuel Services in Erwin, Tennessee; Westinghouse Electric in Columbia, South Carolina; and Siemens Nuclear Power Corporation in Richland, Washington.

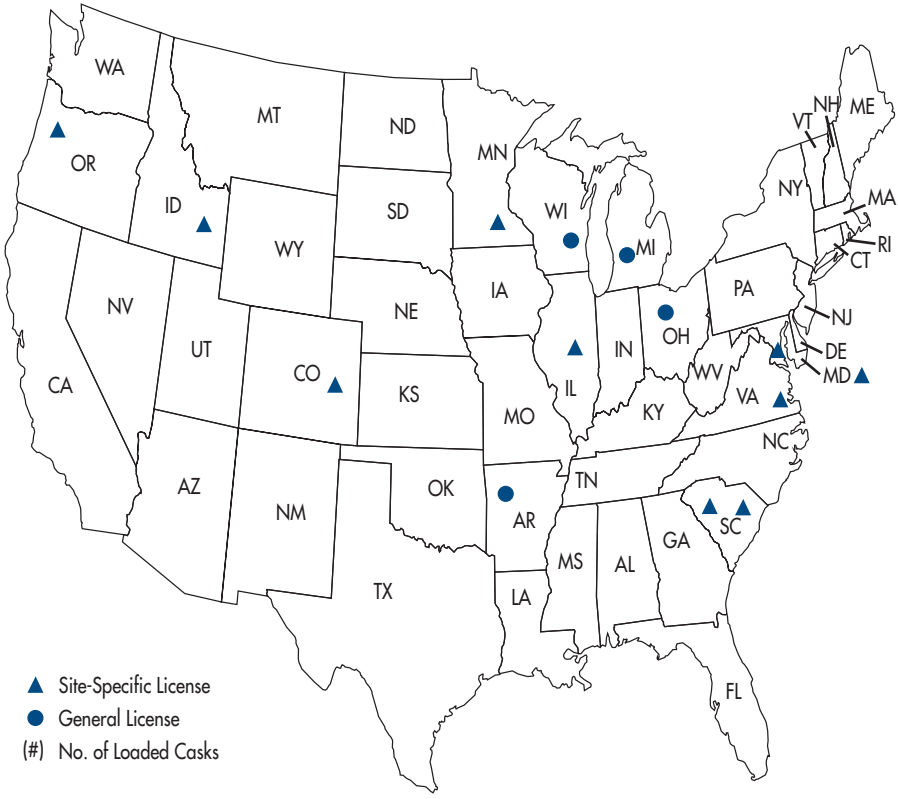
Chemical and radiological hazards at fuel fabrication facilities are similar to enrichment plants. In addition, criticality is a primary concern.

5.4 Spent Fuel Programs

NRC regulates, licenses, and inspects the storage of nuclear reactor spent fuel and the domestic and international transportation of radioactive materials. In 1990, the NRC amended its regulations to store spent fuel at reactor sites in NRC-approved storage casks. Current operating independent spent fuel storage installation (ISFSI) sites are shown in Figure 5.

5.4.1 Spent Fuel Storage. Spent fuel may be stored in several ways. Under 10 CFR Part 50, reactor licensees store spent fuel in on-site pools. These licensees are issued a 10 CFR Part 72 license under which spent fuel can be stored in ISFSIs provided that certain conditions are met. ISFSIs can be on site or off site and use dry storage casks or pools to contain the fuel. Typically, however, ISFSIs are on site, and they use dry storage casks. At nuclear reactors across the country, spent fuel is kept on site, above ground, in systems similar to the ones shown in Figure 6. The hazard involved in transporting such wastes to an offsite location cannot generally be justified in terms of cost benefit. Also, the advantage of dry storage over pool (wet) storage is

Figure 5. Operating Independent Spent Fuel Storage Installations



ARKANSAS
● Arkansas Nuclear 1, 2 (13)

COLORADO
▲ Fort St. Vrain (244)

IDAHO
▲ DOE: TMI-2 Fuel Debris (26)

ILLINOIS
▲ GE Morris (Wet Storage)

MARYLAND
▲ Calvert Cliffs 1, 2 (24)

MICHIGAN
● Palisades (18)

MINNESOTA
▲ Prairie Island 1, 2 (7)

OHIO
● Davis-Besse (3)

OREGON
▲ Trojan (**)

SOUTH CAROLINA
▲ Oconee (44)
▲ H.B. Robinson (8)

VIRGINIA
▲ Surry 1, 2 (37)
▲ North Anna 1,2 (4)

WISCONSIN
● Point Beach (8)

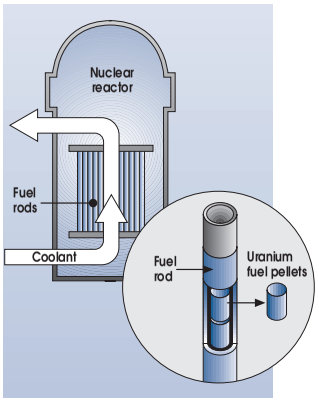
* Data as of July, 2000
**Licensed but none loaded yet

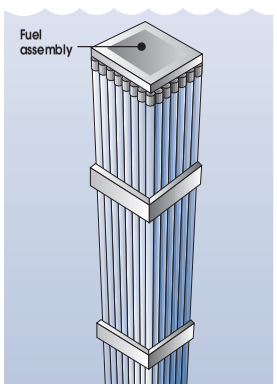
Source: Nuclear Regulatory Commission

Figure 6. Storage of Spent Fuel

At nuclear reactors across the country, high-level radioactive waste is kept on site, above ground, in systems basically similar to the one shown here. On-site storage is supposed to be temporary, however, and many plants have already reached capacity.

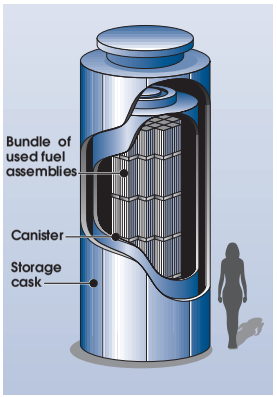
1 Nuclear reactors are powered by enriched uranium-235 fuel. Fission generates heat, which produces steam, which turns turbines to produce electricity. A reactor rated at several hundred megawatts may contain 100 or more tons of fuel in the form of bullet-sized pellets loaded into long rods.

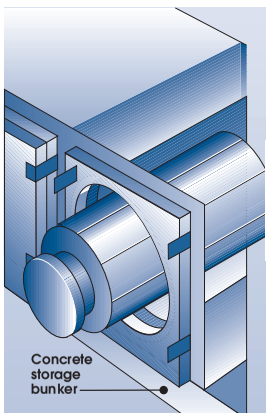




2 After about six years, spent fuel assemblies—typically 14 feet long and containing nearly 200 fuel rods—are removed from the reactor and allowed to cool in storage pools for a few years. At this point, the 900-pound assemblies contain only about one-fifth the original amount of U-235.

3 Once the spent fuel has cooled somewhat, it is loaded into special canisters, each of which is designed to hold about two dozen assemblies. Water and air are removed. The canister is filled with inert gas, welded shut and rigorously tested for leaks. It may then be placed in a "cask" for storage or transportation.





4 The canisters can also be stored in above-ground concrete bunkers, each of which is about the size of a one-car garage. Eventually they may be transported elsewhere for storage.

that it is a passive system requiring minimal human monitoring. Dry storage is far less expensive than comparable pool storage and is significantly safer as there is no risk of accidental loss of cooling or shielding.

NRC performs in-depth safety evaluations of proposed cask designs, provides certificates of compliance for approved cask designs, licenses facilities, monitors cask performance, performs inspections of ISFSI loading and off-loading, and works with the DOE on development of dual-purpose and multi-purpose casks.

5.4.2 Nuclear Materials Transportation and Safeguards. While the ***U.S. Department of Transportation (DOT)*** regulates the shipment of radioactive materials, NRC reviews and certifies the design of containers used to transport radioactive materials; conducts transport-related safety inspections; conducts QA inspections of designers, fabricators, and suppliers of approved transportation containers; and performs safeguards inspections of nuclear material licensees. NRC also establishes regulations that implement DOT requirements and certifies shipping packages (*see* 10 CFR Part 71).

In addition, both the NRC and DOE jointly operate a national database and information support system to track movement of domestic and foreign nuclear material under safeguards control.

5.5 Waste Management

NRC is responsible for the regulation of ***low-level waste*** (LLW), decommissioning, uranium recovery, and the DOE high-level waste repository program. In this capacity NRC—

- reviews applications for the approval or denial of requests to dispose of radioactive waste at sites other than LLW sites (waste sent to a licensed LLW site does not require NRC approval),
- serves as the point of contact for interactions with the EPA,
- implements the ***Site Decommissioning Management Plan*** (SDMP), which includes sites for

which decommissioning is expected to be especially difficult or complicated,

- conducts environmental and safety assessments,
- manages power reactor decommissioning after the spent fuel has been removed,
- interfaces regularly with Federal Agencies, State Agencies, and Indian tribes to promote understanding of LLW and decommissioning programs,
- coordinates the uranium recovery licensing program and activities under the Uranium Mill Tailings Radiation Control Act, including interface with DOE, and
- develops the high-level waste repository program in cooperation with DOE.

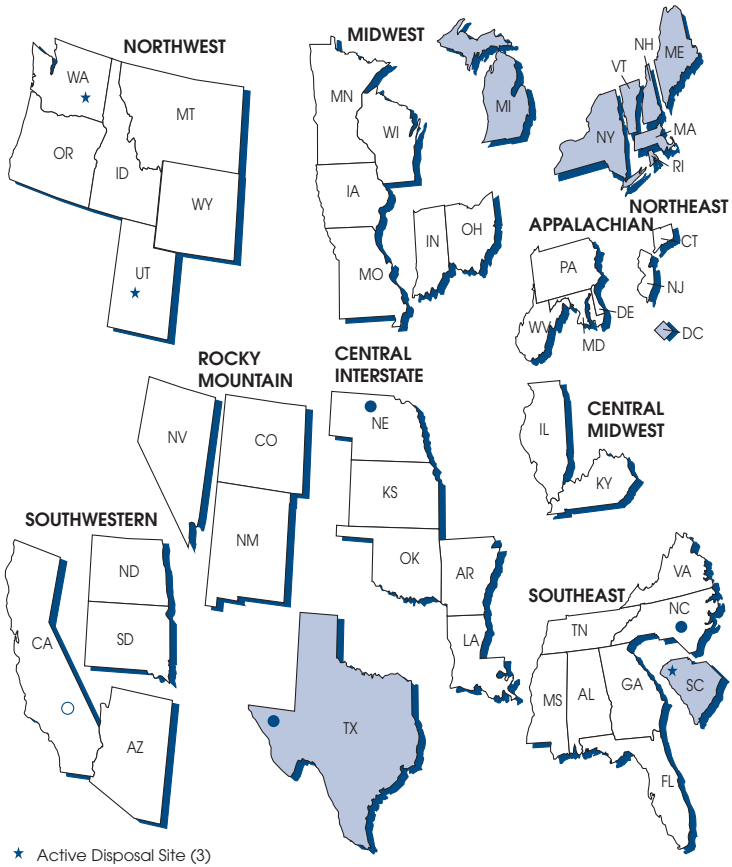
Low-level waste (LLW) comprises the radioactive byproducts of NRC-licensed, or DOE-permitted activities that are not HLW, that do not contain elements with an atomic number higher than uranium, or that are the tailings from the mining of uranium or thorium.

Low-level waste disposal facilities must be licensed by either NRC or Agreement States in accordance with health and safety requirements. The facilities are to be designed, constructed, and operated to meet safety standards. NRC's requirements place restrictions on the types of waste that can be disposed. The LLRWPA authorized the formation of regional compacts; nine compacts are now active (see Figure 7).

High-level waste (HLW) is reactor fuel that has been used in a reactor, liquid products of used reactor fuel reprocessing, or the solids into which such liquids have been converted. HLW is generated by DOE and NRC reactor licensees, which are able to safely store the material. There is no licensed repository for disposal of HLW.

Although NRC is responsible for licensing any repository for spent fuel and HLW disposal, it is DOE that has been ordered by Congress to develop such a repository. Efforts to

Figure 7. U.S. Low-Level Waste Compacts

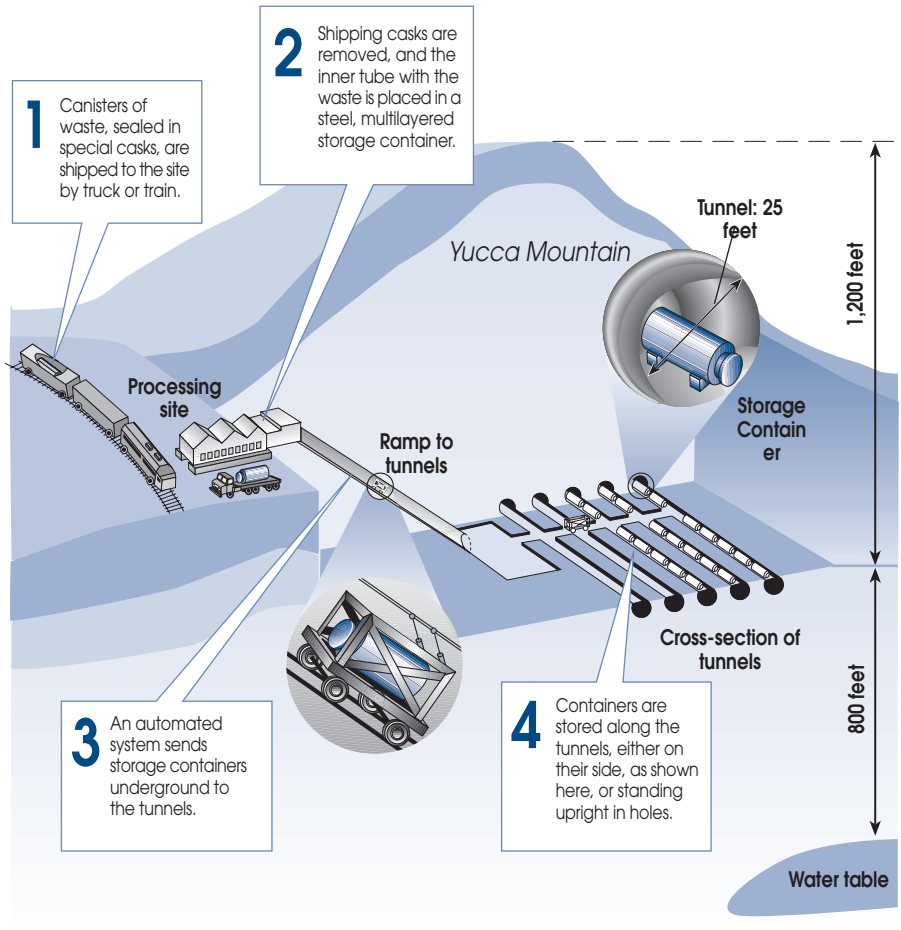


Note: Data as of September 1996. Alaska and Hawaii belong to the Northwest Compact. Puerto Rico is an unaffiliated State. Texas, Maine, and Vermont Compact awaiting Congressional consent.

Source: Nuclear Regulatory Commission

date have focused on the proposed Yucca Mountain site in Nevada (see Figure 8). NRC works closely with DOE to ensure that the license application, when submitted, will address all safety issues of potential concern to NRC. The current NRC approach to the pre-licensing program for Yucca Mountain focuses on 10 key technical issues:

Figure 8. The Yucca Mountain Storage Plan



Source: Department of Energy and the Nuclear Energy Institute

1. Igneous activity
2. Structural deformation and seismicity
3. Evolution of the near-field environment
4. Container life and source term
5. Thermal effects on flow
6. Repository design and thermal-mechanical effects

7. Total system performance assessment and integration
8. Activities related to development of the EPA Yucca Mountain standard
9. Unsaturated and saturated flow under isothermal conditions
10. Radionuclide transport

In order to avoid any conflict of interest, NRC has established and uses the Southwest Research Institute as a Federally Funded Research and Development Center in support of NRC's research in this area. Because DOE is developing the site, and will ultimately be the licensee, it would be inappropriate for NRC to contract with a DOE-managed National Laboratory to perform this research.

6 RESEARCH PROGRAM

The ***Office of Nuclear Regulatory Research*** (RES) conducts the NRC research program. RES is responsible for resolution of generic safety issues at nuclear power plants and other facilities regulated by NRC. Research efforts can be broadly categorized as either anticipatory or confirmatory. NRC's exploratory research program is limited. Some areas of anticipatory research include code development, probabilistic risk assessment, and generic reactor issues such as embrittlement and aging. Safety analyses submitted by licensees may be the subject of confirmatory research. The majority of NRC research is carried out by contractors that the NRC staff oversees. The results from the NRC research program help to resolve important safety issues, evaluate industry initiatives, enhance understanding of new technologies, identify needed enhancements to NRC regulations, and contribute to a more risk-informed, performance-based regulatory framework.

7 INTERNATIONAL PROGRAMS

The ***Office of International Programs*** provides assistance and recommendations to the Chairman, the Commission, and the NRC staff on international issues. This office provides overall coordination of NRC's international activities, including nuclear exports and imports, international safeguards, international physical security, nonproliferation matters, and international cooperation and assistance in nuclear safety and radiation protection.

The NRC participates in a broad program of international cooperation related to nuclear safety and safeguards and has 33 arrangement/letters of agreement signed with regulatory organizations. These arrangements/letters of agreement:

- Provide for bilateral cooperation on nuclear safety, safeguards, waste management, and radiological protection with the following countries:

  Argentina, Belgium, Brazil, Canada, China, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Indonesia, Israel, Italy, Japan, Kazakhstan, Korea, Lithuania, Mexico, Netherlands, Peru, Phillippines, Russia, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Ukraine, and the United Kingdom.

- Ensure prompt notification of these countries of safety problems that warrant action or investigation

NRC also participates in the programs of the ***International Atomic Energy Agency*** (IAEA) and the ***Organization for Economic Cooperation and Development's Nuclear Energy Agency*** (OECD/NEA), which are concerned with the physical protection of nuclear materials, reactor safety research and regulatory matters, radiation protection, risk assessment, waste management, transportation, safeguards, training, and technical assistance.

8 HOW'D THEY DO THAT?

NRC uses many mechanisms for implementing its regulatory programs. The following section briefly describes some of the more important ones.

8.1 Rules and Regulations

NRC provides licensees with requirements that, if met, will result in adequate protection of workers, the public, and the environment. The impetus of a proposed rule could be a requirement issued by the Commission, a petition for rulemaking by a member of the public, or research results that indicate a need for a rule change. The proposed rule is published in the ***Federal Register*** along with background information about the proposed rule, to whom comments should be addressed, when comments should be received in order to ensure consideration by the staff, why the rule change is thought to be needed, and the proposed text to be changed. Usually, the public is given 75 to 90 days to provide written comments. Once the public comment period has closed, the staff analyzes the comments, makes any needed changes, and forwards the ***Final Rule*** to the NRC Commissioners for approval. Once approved, the final rule is published in the *Federal Register* and usually becomes effective 30 days later.

For especially important or controversial rules, the staff may publish an ***Advanced Notice of Proposed Rulemaking*** (ANPR) or conduct one or more public meetings. The ANPR solicits comment well in advance of the proposed rulemaking stage. The need for some action is described but only broad concepts are discussed for a proposed action.

The Agreement States are consulted at several additional stages to ensure that any proposed rulemaking reflects any State concerns. Most rulemakings associated with the materials (non-reactor) program are discussed at the annual All-Agreement States meeting and at the ***Conference of Radiation Control Program Directors*** meeting. Once NRC

has issued a final rule, Agreement States have up to 3 years to change their own regulatory programs. In some cases, the rules adopted by the Agreement States must be very close to the NRC requirements. In other cases, States may be flexible in developing their own requirements to achieve the same fundamental objectives.

Proposed rulemakings are presented by technical staff at professional meetings held around the country. In 1997, an electronic Technical Conference Forum was developed by NRC to make early draft guidance documents and rulemakings available for public discussion and comment. The ***Technical Conference Forum*** is located at the web address **<http://techconf.LLNL.gov/>**.

8.2 Licensing Guidance

Standard Review Plans (SRPs) are developed by the staff to describe how a license application is to be reviewed by the NRC staff. An SRP is published as a draft for public comment before it is issued to seek licensee input. Final SRPs are available to assist licensees in developing a license application.

8.3 Consolidated Guidance

NRC is consolidating and updating numerous guidance documents into a single, comprehensive repository, calling them Consolidated Guidance documents, and publishing them as volumes in NUREG-1556. The volumes are intended to be used by applicants, licensees, and NRC staff to address issues in preparing license applications, administering a program, reviewing an application, and issuing a license, These documents take a risk-informed, performance-based approach to the different types of licensees and radioactive material uses.

8.4 Enforcement and Legal Opinions

The basic enforcement sanctions available to the NRC are Notices of Violation, civil penalties, and orders of various types.

- A ***Notice of Violation*** (NOV) is a written notice issuing one or more violations of a legally binding requirement. The NOV normally requires the recipient to provide a written statement describing (1) the reasons for the violation or, if contested, the basis for disputing the violation; (2) corrective steps that have been taken and the results achieved; (3) corrective steps that will be taken to prevent recurrence; and (4) the date when full compliance will be achieved. The NOV is the most common method for formalizing a violation.

- A ***civil penalty*** is a monetary penalty that may be imposed for violation of (1) certain specified licensing provisions of the Atomic Energy Act or supplementary NRC rules or orders; (2) any requirement for which a license may be revoked; or (3) reporting requirements under Section 206 of the Energy Reorganization Act. Civil penalties are designed to deter future violations both by the involved licensee as well as by other licensees conducting similar activities and to emphasize the need for licensees to identify violations and take prompt corrective action. Violations that are the most significant are assigned a Severity Level I. Severity Level IV violations are the least significant. Severity Level I and II violations are always assessed a civil penalty, whereas Severity Level III violations may result in a fine. Licensees are not fined for Severity Level IV violations.

- An ***order*** is a written NRC directive to modify, suspend, or revoke a license; to cease and desist from a given practice or activity; or to take such other action as may be proper (see 10 CFR Section 2.202). Orders may also be issued in lieu of, or in addition to civil penalties, as appropriate, for Severity Level I, II, or III violations. Orders are usually issued following an NOV to require timely corrective actions.

- A non-cited violation is a minor violation for which the licensee is not cited, but rather less formally notified.

The ***Deputy Executive Director for Reactor Programs*** approves or issues all escalated enforcement actions (Severity Level I-III) to reactor Licensees, including orders and civil penalties. In addition, the ***Deputy Executive Director for Materials, Research and State Programs*** is authorized to approve or issue all other escalated matters.

Legal opinions and interpretations of NRC regulations and policies are issued only by the ***Office of the General Counsel*** (see 10 CFR Part 8). Any opinion given by staff, even senior staff, is not binding on the Commission.

8.5 Memoranda of Understanding

NRC has entered into Memoranda of Understanding (MOUs) with several agencies to avoid duplication of effort where regulatory authority overlaps. MOUs have been signed with the following agencies:

- ***Occupational Safety and Health Administration*** (OSHA), which allows NRC inspectors to identify violations of OSHA requirements at NRC-licensed facilities.
- DOT, which allows NRC to inspect and enforce requirements for shipping containers used to transport radioactive materials in the United States.
- EPA, which allows NRC to inspect and enforce radionuclide air emissions (previously under EPA's Clean Air Act Standards) at NRC-licensed facilities.

8.6 Regulatory Guides

Regulatory Guides describe methods to implement specific parts of the Commission's regulations, techniques used by the staff to evaluate specific problems or postulated accidents, and data needed by the staff in its review of applications for permits or licenses. The guides are available to the public and are divided into ten divisions:

1. Power Reactors
2. Research and Test Reactors

3. Fuels and Materials Facilities
4. Environmental and Siting
5. Materials and Plant Protection
6. Products
7. Transportation
8. Occupational Health
9. Antitrust and Financial Review
10. General

Regulatory guides provide licensees with methods to demonstrate compliance with NRC requirements that are acceptable to staff. Usually, one or more regulatory guides is written for every new major rule. Draft regulatory guides are issued for public comment in the early stages of development and are distributed to all potentially affected licensees and other interested parties. They have not received complete staff review and do not present an official NRC staff position. After a comment period of typically 30 to 90 days, the staff will review the comments received, revise the guide accordingly, and issue a final guide.

Regulatory guides may be withdrawn when they are superseded by the Commission's regulations, when equivalent recommendations have been incorporated in applicable approved codes and standards, or when obsolete. The withdrawal of a guide does not alter any prior or existing licensing commitments.

Single copies of draft and final regulatory guides, may be obtained free of charge by writing to the Office of the Chief Information Officer, Reproduction and Distribution Services Section, U.S. Nuclear Regulatory Commission, Mail Stop OP1-33, Washington, DC 20555-0001, or by sending a facsimile to 301-415-2289 or an e-mail message to **<distribution@nrc.gov>**. Requests for draft guides will be filled as long as supplies last. A request for placement on an automatic distribution list should be sent to this address as

well. Active guides may also be purchased from the National Technical Information Service (NTIS) on a standing order basis. Details on this service may be obtained by writing to NTIS, 5285 Port Royal Road, Springfield, VA 22161. Regulatory guides can also be viewed or downloaded at NRC Web site address **<www.nrc.gov/NRC/RG/index.html#Active>**.

8.7 Inspection Guidance

When new rules or regulatory guides are developed, the staff revises related inspection guidance so that all inspectors are aware of the new or revised requirements. This ensures that inspection actions across the regions remain consistent. These modules describe what the inspector should look for, how to document findings, and what actions are to be taken. Licensees and members of the public can review the inspection modules at NRC's web site address, **<www.nrc.gov/NRC/IM/index.html>**, request copies of inspection guidance, or provide comments at any time.

8.8 Generic Communications

When an issue arises that might suggest a safety concern for many individual licensees, NRC issues one of four types of generic communications: (1) regulatory issue summaries, (2) an information notice, (3) a bulletin, or (4) a generic letter. Generic communications are also sent to manufacturers, suppliers, service groups, and regulatory organizations to communicate safety information that may be relevant to their activities.

- ***Regulatory Issue Summaries*** are used when no response or action is requested and are used to—

  a. document NRC endorsement of the resolution of issues addressed by industry-sponsored initiatives,

  b. solicit voluntary license participation in staff-sponsored pilot programs,

  c. inform licensees of opportunities for regulatory relief, and

d. announce staff technical or policy positions not previously communicated to industry or not broadly understood.

- ***Information Notice***. This is issued to inform addressees of significant, recently identified operating experience. Addressees are expected to review the information for applicability to their operations and consider actions, as appropriate, to avoid similar problems. An information notice does not impose or imply new requirements, or interpret regulations, and does not require specific actions. Therefore, an addressee response to NRC is not required. In some cases, the staff may also issue a bulletin or generic letter on a topic addressed in an information notice.

- ***Bulletin.*** This informs addressees of recently identified "urgent" safety issues and may request information or action or both and requires a response under oath or affirmation, in keeping with its urgent nature. Written responses are in accordance with Section 182a, Atomic Energy Act of 1954, as amended. Bulletins that request action will be reviewed in accordance with benefit requirements. If a bulletin states a new staff position not previously communicated or broadly understood, the staff will so inform the Commission.

- ***Generic Letter.*** A type of generic communication issued to address safety issues such as —

  a. requesting that analyses be performed or proposed corrective actions submitted regarding matters of safety, safeguards, or environmental significance. The addressees may be asked to accomplish the actions and report their completion by letter with or without prior NRC approval. Information relating to these analyses may be requested on a voluntary basis or required in accordance with Section 182a, Atomic Energy Act of 1954, as amended. This type of generic letter may request new or revised licensee commitments or other continuing actions.

b. requesting addressees to submit technical information that NRC needs to perform its function. The information may be requested on a voluntary basis or required in accordance with Section 182a, Atomic Energy Act of 1954, as amended.

c. requesting or providing the opportunity to addressees to submit proposed changes to technical specifications or license commitments.

d. providing staff technical or policy positions not previously communicated or broadly understood.

e. soliciting voluntary participation in technical pilot programs.

If a generic letter states a new staff position or requests new licensee commitments, the staff will so inform the Commission before (if practicable) or immediately after the generic letter is issued.

8.9 Codes and Standards

NRC staff participates in the development of industry standards and codes so that the resulting standard or software will be acceptable for use by licensees in demonstrating compliance with requirements. In some cases, NRC will endorse the standard or code in a regulatory guide.

8.10 NRC Reports

NRC also publishes reports and brochures that provide useful information to licensees, identified by an alpha numeric designator in the NUREG series (NUREG-XXXX for a report, or NUREG/BR-XXXX for a brochure, or NUREG/CR-XXXX for a contractor report). NUREG-series publications contain only unclassified information. These publications can present the result of research performed by NRC or its contractors, provide a compilation of data collected by NRC, or provide technical information such as that found in a text book. They do not contain any legally binding regulatory requirements although the

staff may incorporate part or all of the information in other guidance documents. Some publications are available on the internet at **<http://www.nrc.gov/NRC/NUREGS/indexnum.html>**. In addition, the public may buy these publications from—

The Superintendent of Documents
U.S. Government Printing Office
P.O. Box 37082
Washington D.C. 20402-9328
<http://www.access.gpo.gov/su_docs/>
202-512-1800
The National Technical Information Service
Springfield, VA 22161-0002
<http://www.fedworld.gov/onow/>
703-487-4560

9 EXPECTATIONS OF LICENSEES

The NRC and its licensees share a common responsibility to protect public health and safety. Federal regulations and the NRC regulatory program are important elements in the protection of the public. NRC licensees, however, are primarily responsible for safely using nuclear materials. NRC's safety philosophy explains that "although the NRC develops and enforces the standards governing the use of nuclear installations and materials, it is the licensee who bears the primary responsibility for conducting those activities safely." NRC's role is not to monitor all nuclear operator activities, but rather to oversee and audit licensees, registrants, or certificate holders so that the NRC can focus its activities where the regulatory need is greatest.

This safety philosophy is intended to clarify, beyond any possibility of misunderstanding, that the primary responsibility never shifts from the licensee. If a licensee's activities are not in accordance with its license, or with the NRC's regulations, the licensee is responsible and accountable—whether or not the NRC could or should have detected the noncompliance and required corrective action. A licensee should perform self-assessments, audits, and periodic reviews regularly to ensure that its program is functioning effectively.

Risk Informed Regulation

Whether at a reactor or in a nuclear medicine laboratory, NRC requires that licensees manage the risks associated with the use of radioactive materials. Further, NRC requires that licensees manage risk under normal circumstances as well as during postulated accidents or actual events.

As mentioned earlier, the NRC has established its regulatory requirements to ensure that a licensed facility is designed, constructed, operated, maintained, and modified in a manner that will not result in undue risk to public health and safety. NRC requirements have been based largely on engineering cri-

teria selected on the basis of best available data and technical judgements of subject matter experts. These criteria are used to establish safety margins through the use of multiple barriers and the "defense-in-depth" philosophy.

Of all the tools available, ***Probabilistic Risk Assessment*** (PRA) methods offer the most potential to sharpen the focus and to improve the effectiveness of NRC requirements. PRA fosters better decision-making by concentrating on those aspects of a facility most important to safety, thereby better utilizing resources and reducing unnecessary burden. PRA insights and information have been applied successfully in numerous regulatory activities and have proven to be a valuable complement to deterministic engineering approaches. NRC risk assessment activities for nuclear power plant licensees are included in the preparation of draft Regulatory Guides and Standard Review Plans, development of the Commission Safety Goals, initiation of pilot applications in specific areas, and review of licensee Individual Plant Examinations.

NRC provides guidance on using PRA to support and evaluate plant-specific changes to the licensing basis. The "licensing basis" refers to that set of regulations, license conditions, technical specifications, and commitments that define the design and operating envelope within which a licensee must maintain and operate its facility.

When using risk assessment insights to support plant-specific changes to the licensing basis, a licensee must adhere to these fundamental safety principles:

1. The licensee must meet existing regulations or propose an appropriate change or exemption.
2. The licensee must maintain defense-in-depth.
3. The licensee must maintain sufficient safety margins–which means that, where limits have been established through regulation, or through commitment to codes, standards, or Regulatory Guides, those limits should be observed, unless a change is proposed and approved.

4. The licensee must ensure that any increases in risk (including the cumulative effect of all proposed increases) should be small and should not cause the NRC Safety Goals to be exceeded.

5. The licensee must use performance-based implementation and monitoring strategies that address uncertainties in the analysis models and data and provide for timely feedback and corrective action. Performance-based implementation and monitoring is a method of checking key PRA analysis assumptions by observing actual equipment or system performance. If performance is not consistent with the assumptions in the analysis, then feedback and corrective action should be taken to revise the proposed change or to improve equipment or system performance. In effect, it is a way to reduce uncertainty and ensure PRA validity.

These five principles ensure that traditional NRC approaches to safety regulation are maintained and that the insights from risk assessment are used to focus the reviewers on the most important safety-significant issues.

10 IS YOUR VOICE BEING HEARD?

Individuals can have their opinions considered by NRC in a number of ways. Probably the most important way to have a say in how NRC implements its program is through written comment on proposed rules, regulatory guides, SRPs and other published documents. To be really effective, comments should be concise, specific, and well-reasoned. That is, a lengthy discussion of a certain issue is sometimes less useful than a one- or two-page comment that includes suggested alternatives and a concise rationale for the proposed alternative. Some other ways in which you can obtain information or voice your opinion are provided in the following sections.

10.1 The Freedom of Information Act

Under the Freedom of Information Act (FOIA), any member of the public can request virtually any information from any government agency (see 10 CFR Section 9.23, "Requests for Records"). The request must be in writing and must clearly state on the envelope and in the letter that it is a "Freedom of Information Act request." The request must describe the agency records sought in sufficient detail to permit the NRC to identify the requested agency records. Where possible, the requestor should specify dates, NRC license number, licensee docket number, or other information that may help identify the agency records.

For any FOIA request, a requestor may be charged fees for the time to search for and review records and for the number of pages copied. Requests for NRC agency records should be addressed to the Freedom of Information and Privacy Act Officer, Office of the Chief Information Officer, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Requests may also be made directly from the Freedom of Information Act and Privacy Act Program Homepage at web address **<http://www.nrc.gov/NRC/FOIA/foia.html/>**.

10.2 NRC Web Site

NRC has a Web site containing a variety of information, such as the full text of press releases, significant speeches, summaries of proposed and final rules, the full text of some *Federal Register* notices, generic communications to licensees, inspection manual chapters, and much more. To learn more about this capability, visit the NRC web site **<www.nrc.gov>**. From there, you can find information on virtually every topic discussed in this brochure.

10.3 For More Information...

The NRC offers a variety of programs to make agency, licensee, and nuclear industry information available to the public. The agency maintains a ***Public Document Room*** (PDR) that includes a comprehensive collection of over 2 million publicly released documents related to NRC licensing proceedings, rulemaking activities, and of policy issues for nuclear regulation in the United States. The PDR can provide access to these documents anywhere in this country or overseas via various electronic systems, including an online search and retrieval capability and a bulletin board for selected meeting announcements. Members of the public can obtain documents submitted to NRC, unless they contain proprietary information, as well as documents produced by NRC. There is a modest charge for postage and copying. For further information, telephone 202-634-3273, or toll free, 800-397-4209; internet e-mail message to **<pdr@nrc.gov>**; telefacsimile to 202-634-3343; or write to the PDR, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001.

In January 2000, NRC began using its new Agency Document Access and Management System (ADAMS) for making public documents available through the new "Public Electronic Reading Room" on the NRC Web site at **<http://www.nrc.gov/NRC/ADAMS/index.html>**.

Persons wanting copies of both new and older documents will be able to order them for a fee from the Public Document Room by mail, electronic mail, telefacsimile, toll-free telephone, or on-line directly from the NRC Public Electronic Reading Room. Bibliographic descriptions of the older documents will also be searchable via this Web site. Paper copies of new records may be obtained by downloading and printing them directly from the Internet.

Making documents available through ADAMS will have a number of benefits:

- Post-ADAMS records will be available electronically in full text and image, which has not normally been the case.
- ADAMS will provide full-text search capability and will make it easier to identify records that meet users' search criteria.
- Newly received and generated records will be available to the public within days instead of weeks.
- Through the Internet, a great many more members of the public will have ready access to NRC documents.

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APPENDIX A

Title 10 of the *Code of Federal Regulations*

Part	Title
0	Conduct of Employees
1	Statement of organization and general information
2	Rules of practice for domestic licensing proceedings and issuance of orders
4	Nondiscrimination in Federally assisted Commission programs
7	Advisory Committees
8	Interpretations
9	Public Records
10	Criteria and procedures for determining eligibility for access to restricted data or national security information or an employment clearance
11	Criteria and procedures for determining eligibility for access to or control over special nuclear material
12	Implementation of the Equal Access to Justice Act in agency proceedings
13	Program fraud civil remedies
14	Administrative claims under Federal Tort Claims Act
15	Debt collection procedures
16	Salary offset procedures for collecting debts owed by federal employees to the General government
19	Notices, instructions and reports to workers: inspection and investigations
20	Standards for protection against radiation
21	Reporting of defects and noncompliance
25	Access authorization for licensee personnel
26	Fitness for duty programs
30	Rules of general applicability to domestic licensing of byproduct material
31	General domestic licenses for byproduct material
32	Specific domestic licenses to manufacture or transfer certain items containing byproduct material
33	Specific domestic licenses of broad scope for byproduct material
34	Licenses for radiography and radiation safety requirements for radiographic operations
35	Medical use of byproduct material
36	Licenses and radiation safety requirements for irradiators
39	Licenses and radiation safety requirements for well logging

Part	Title
40	Domestic licensing of source material
50	Domestic licensing of production and utilization facilities
51	Environmental protection regulations for domestic licensing and related regulatory functions
52	Early site permits; standard design certification; and combined licenses for nuclear power stations
54	Requirements for renewal of operating licenses for nuclear power plants
55	Operators' licenses
60	Disposal of high-level radioactive wastes in geologic repositories
61	Licensing requirements for land disposal of radioactive waste facilities
62	Criteria and procedures for emergency access to non-federal and regional low-level waste facilities
70	Domestic licensing of special nuclear material
71	Packaging and transportation of radioactive material
72	Licensing requirements for the independent storage of spent nuclear fuel and high-level radioactive waste
73	Physical protection of plants and materials
74	Material control and accounting of special nuclear material
75	Safeguards on nuclear material — implementation of US/IAEA agreement
76	Certification of gaseous diffusion plants
81	Standard specifications for the granting of patent licenses
95	Security facility approval and safeguarding of national security information and restricted data
100	Reactor site criteria
110	Export and import of nuclear equipment and material
140	Financial protection requirements and indemnity agreements
150	Exemptions and continued regulatory authority in Agreement States and in offshore waters under section 274
160	Trespassing on Commission property
170	Fees for facilities, materials, import and export licenses, and other regulatory services under the Atomic Energy Act of 1954, as amended
171	Annual fees for reactor operating licenses, and fuel cycle licenses, and materials licenses, including holders of certificates of compliance, registrations, and quality assurance program approvals and government agencies licensed by NRC.