



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

October 6, 2016

Current Owner  
Bristol Hospital, Inc  
8 Brewster Road  
Bristol, CT 06010

**SUBJECT: INGRAHAM CLOCK COMPANY-3 – REQUEST FOR INITIAL SITE VISIT AND  
TO PERFORM RADIOLOGICAL SURVEYS**

Dear Current Owner:

I am writing to inform you that our records indicate that your property at 420 N. Main Street, Bristol, Connecticut, is a site where radium-226 was previously used. Specifically, a building that were previously on your property were used in the manufacturing of clocks that had radium-luminous dials. If you are not the current owner of the property, please let us know whom we should contact. Radium-226 is a radioactive isotope that, in certain quantities, may pose a risk to public health and safety. Radium-226 is regulated by the U.S. Nuclear Regulatory Commission (NRC). We do not know whether there is a current radiological issue at your property, and it is important that you contact us at your earliest convenience. We are requesting access to your property to perform radiological surveys and to collect samples to determine whether there is any residual contamination resulting from this historical manufacturing on your property. This testing will not damage your property and these tests will be conducted at no cost to you. If residual contamination at your property has already been remediated, please provide us with records describing cleanup activities and the status of the remediation.

To successfully complete our tests, we need to schedule an initial visit. The initial site visit will serve two purposes: 1) to determine whether there is any readily detectable radium contamination; and 2) to allow us to start planning a scoping survey, if needed. During our initial site visit we will determine if a follow-up scoping survey is necessary. The scoping survey will involve a more detailed radiological survey to determine if there is any residual contamination. After each visit, we will share results with you as soon as they are available.

These tests will determine whether your site requires remediation to remove residual contamination. Should remediation be required, we will provide additional information on any actions that may be necessary to ensure protection of public health and safety. Please be aware that under the NRC's regulations, site owners are responsible for the costs associated with these remediation activities; as a regulatory agency, the NRC cannot provide funding. This does not, however, preclude site owners from using alternative legal options that may be available under State or Federal law to fund remediation activities. We recognize that you may not be aware of historical radium manufacturing at your site and we will continue to work with you to address and resolve this matter.

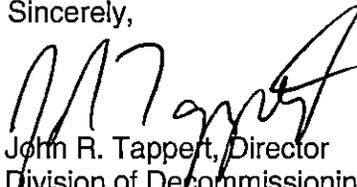
The enclosed Site Summary Report provides all of the information that the NRC has concerning historical radium storage at your property, which we found through a search of publicly available

information. The enclosed Backgrounder provides more detail on the history of radium use and its potential health effects. The enclosed brochure provides an overview of the NRC.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

We would like to work with you to schedule our initial site visit and answer any questions you might have. At your earliest convenience, please contact Mr. Matthew Meyer, Acting Chief, Materials Decommissioning Branch, Division of Decommissioning, Uranium Recovery and Waste Programs, Office of Nuclear Materials Safety and Safeguards, at (301) 415-6198, or Mr. David Misenhimer, Project Manager, at (301) 415-6590.

Sincerely,



John R. Tappert, Director  
Division of Decommissioning, Uranium Recovery  
and Waste Programs  
Office of Nuclear Material Safety  
and Safeguards

Docket Nos.: 3038979

Enclosures:

1. Site Summary Report
2. Radium Backgrounder
3. U.S. Nuclear Regulatory Commission *Overview*

REGISTERED LETTER – RETURN RECEIPT REQUESTED

## Ingraham Clock Company: Site Summary

The following information was extracted from public records and the “CT File.PDF” (CT-DEP, 2009).

### Address

284 N. Main Street  
400 N. Main Street  
420 N. Main Street  
430 N. Main Street  
210 Redstone Hill Road (Ingraham Company was at this location from 1958-1967)  
Bristol, CT

### Site Description/History

According to CT DPH (1998), the Ingraham Clock Factory used radium in their clock production. Luminous radium was used in painting dials on clocks because it makes them glow in the dark. It was believed to be used from the early 1900’s through the 1940’s in the production of clocks.

The Ingraham Clock Company was founded in 1884 and occupied several buildings on North Main Street (Russell, 2010). With increased sales by improving manufacturing machinery by 1904, Ingraham’s new/renovated building was constructed by replacing the wooden buildings with brick ones. Clocks and watches with luminous radium paint were manufactured in these buildings (Russell, 2010).

Clock production ceased in 1942 during the war and resumed again in 1946. In 1958, the company name was changed to the Ingraham Company along with a move from North Main Street to Bristol’s Redstone Hill Industrial Park (210 Redstone Hill Road). It is unknown if luminous radium materials were moved to this new manufacturing location (Russell, 2010). In 1967, Ingraham was bought by McGraw-Edison and renamed Bussmann Division (Russell, 2010). The building at 210 Redstone Hill Road is currently owned by Rowley Spring and Stamping Corporation (CT-DEP, 2009).

During the 1960’s, the abandoned buildings at the North Main Street location were torn down in a redevelopment project (CT-DEP, 2009). Information from the CT file.PDF (CT-DEP, 2009) states “Extensive testing took place pre-1980 but exact dates are unknown. Test wells were drilled and still exist. Soil was cleared for use as cover material at a Bristol landfill. A river running through the site was piped underground”. It is unknown exactly what was tested and if radium was included in the testing. As part of the redevelopment, residential and commercial properties were developed in the 1980’s and early 1990’s at the North Main Street locations. New construction took place at: 1) 430 N. Main St. in the early 1980’s; 2) 284 N. Main St. in 1987, 3) 400 N. Main St. in 1989-90, and 4) 420 N. Main St. in 1990-91 (CT-DEP, 2009). It is unknown if soil at the North Main St. location of the former Ingraham Company was tested for radium. Therefore, potential radium contamination may still exist in the soil.

**The amount/extent of radium contamination at these sites (including historical information and/or informed assumptions about the radium facilities' structures/areas, processes, and activities)**

It is known that the Ingraham Clock Company painted clocks and watches with luminous radium at the buildings located on North Main Street in Bristol CT. It is unknown what type of testing took place. No survey data was located.

It is unknown whether the use of luminous radium materials continued after Ingraham Company moved to Bristol's Redstone Hill Industrial Park at 210 Redstone Hill Road in 1958.

Summary of Current Radium Levels:

As of November 2015, current levels of radium are unknown based on information reviewed for this report.

**Location and population near the sites**

There are residential and commercial areas (Figure 1) within close proximity to where the former clock factory buildings on North Main Street were originally located. Redevelopment of the former Ingraham Clock Company facilities on North Main Street has resulted in mixed use facilities and multiple occupancy facilities. For instance, DeLorenzo Towers consists of 90 units with a full occupancy of approximately 120 residents. Also, Ingraham Manor on average houses 126 residents.

Bristol is a suburban city located in Hartford County, Connecticut, 20 miles southwest of Hartford. According to the 2010 U.S. Census, the population of Bristol was 60,477; the 2014 population estimate for the city was 60,570 (United States Census Bureau, 2015).



Figure 1. Locations of Ingraham Clock Company facilities (1- 400 N. Main St. (now Ingraham Manor), 2- 420 N. Main St. (now medical offices), 3- 430 N. Main St. (now a strip mall), 4- 284 N. Main St. (now DeLorenzo Towers) (Google Earth, 2015)

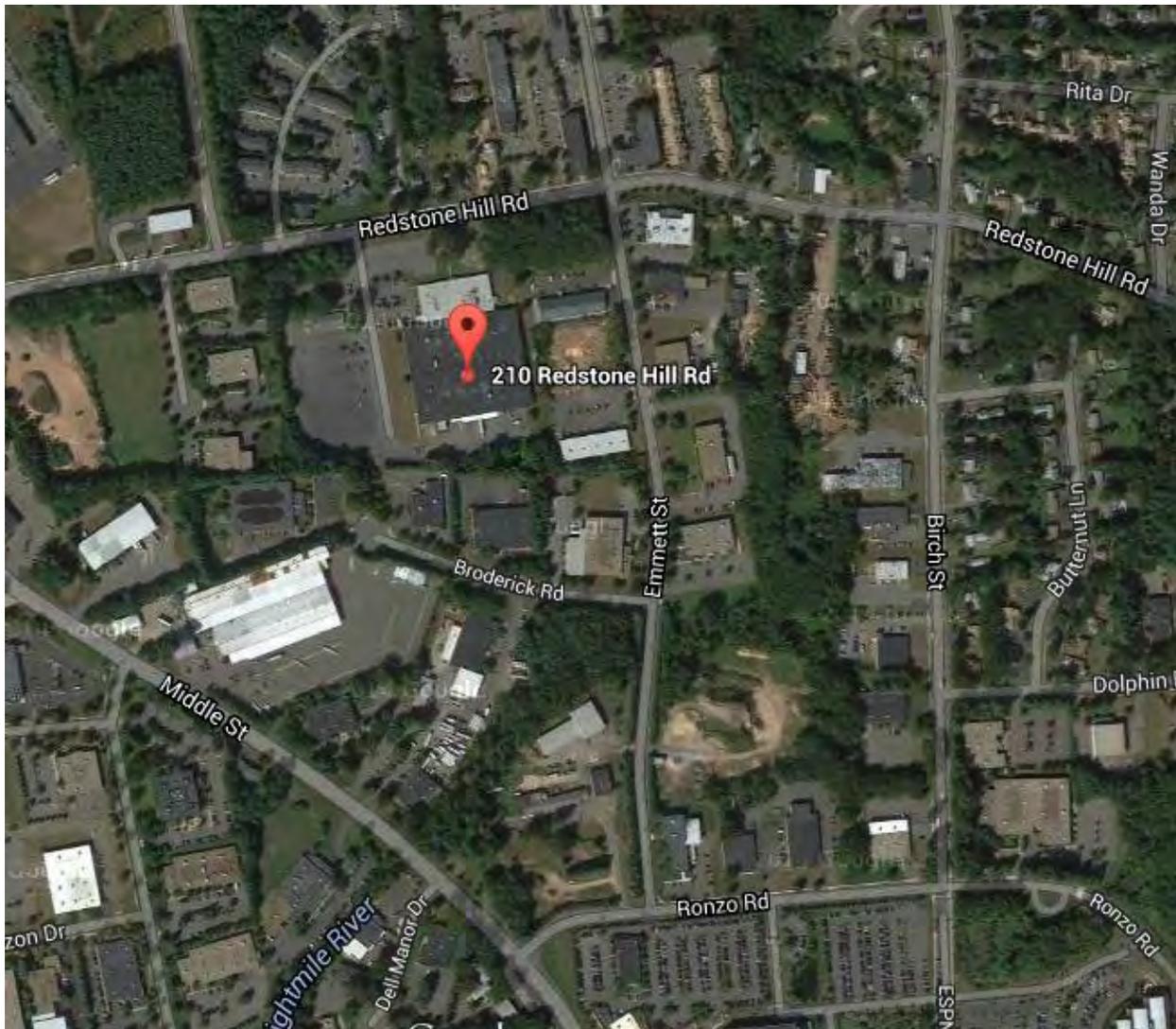


Figure 2. 210 Redstone Hill Rd. (Google Earth, 2015)

### **Current State/other Federal involvement**

In 2001, the CT State Bond Commission approved \$750,000 to support cleanup of radioactive material found at old clock factory sites in Bristol, New Haven, Thomaston and Waterbury. It is unknown if any of these clean-up funds were allocated to the former Ingraham Clock Company sites at North Main Street.

### **Current access, activities, and uses at the site**

Today the properties located on North Main Street include; 1) Ingraham Manor (Figure 3), a short- and long-term rehabilitation for patients recovering from orthopedic injuries, neurological disorders, cardiac-related illnesses, or surgical procedures, 2) Medical offices, such as specialty doctors, and hospice care (Figure 4), 4) A strip mall that includes a pharmacy and a supermarket (Figure 5), and 5) DeLorenzo Towers (Figure 6), an elderly low-income housing development.



Figure 3. 400 N. Main St. (Ingraham Manor) (Google, 2015)



Figure 4. 420 N. Main St. (medical offices) (Imagery Date 11/2008) (Google, 2015)



Figure 5. 430 N. Main St. (Strip mall) (Google, 2015)



Figure 6. 284 N. Main St. (DeLorenzo Towers) (Imagery Date 11/2008) (Google, 2015)

The former location of Ingraham Clock Company (from 1958 to 1967) at 210 Redstone Hill Road is currently occupied by Rowley Spring and Stamping (Figure 7).



Figure 7. 210 Redstone Hill Road (Rowley Spring and Stamping) (Imagery Date October 2012) (Google, 2015)

### **Existing Engineering Controls**

The original buildings at the North Main Street location have been demolished and replaced with active commercial properties and residential living. The areas are currently in use for commercial and residential activities.

The 210 Redstone Hill Road location is currently occupied by Rowley Spring and Stamping.

### **Prioritization Ranking**

Radium is confirmed to have been present at the North Main Street site based on historical documentation that radium was used in the manufacturing facility on North Main Street. The original buildings are gone and the site has been redeveloped. The North Main Street site consists of soil that is potentially contaminated with radium. The site is occupied or frequented by visitors. Therefore, the site is classified as Tier 1.

When the Ingraham Company moved to Bristol's Redstone Hill Industrial Park at 210 Redstone Hill Road in 1958, it is unknown whether the use of luminous radium materials continued at this location. Additional information is needed to determine whether radium was present at the 210 Redstone Hill Road location.

### **References**

CT-Department of Environmental Protection (DEP). 2009. Correspondence from CT-DEP to NRC NMSS. Collection of pdf documents about Connecticut Clock Companies. Document dates range from 1998-2004. CT File.pdf, 1806 pages.

CT Department of Public Health (DPH). 1998. Former Clock Factory Sites in Bristol: Q & A About Radium. October 1998.

[http://www.ct.gov/dph/lib/dph/environmental\\_health/eoha/atsdr/bristolradiumfactsheet.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/eoha/atsdr/bristolradiumfactsheet.pdf).

Google Earth. Accessed February 2015. <http://www.google.com/maps/>.

Russell, Lynda J. Bristol Business and Industry. 2010. Pages 18-22.

[https://books.google.com/books?id=jxpUi-wgCRkC&pg=PA22&lpg=PA22&dq=rowley+spring+210+redstone+hill+ingraham&source=bl&ots=8BXczW0dct&sig=0tTfY1UaUKa\\_6h-X6MCA6CZ5Cjk&hl=en&sa=X&ei=0H3nVPOGKsSpgwTv6IDoCw&ved=0CB4Q6AEwAA%20-%20v=onepage&q&f=false#v=onepage&q&f=false](https://books.google.com/books?id=jxpUi-wgCRkC&pg=PA22&lpg=PA22&dq=rowley+spring+210+redstone+hill+ingraham&source=bl&ots=8BXczW0dct&sig=0tTfY1UaUKa_6h-X6MCA6CZ5Cjk&hl=en&sa=X&ei=0H3nVPOGKsSpgwTv6IDoCw&ved=0CB4Q6AEwAA%20-%20v=onepage&q&f=false#v=onepage&q&f=false).

United States Census Bureau. Accessed October 2015.

<http://quickfacts.census.gov/qfd/states/09/0908420.html>.

Summary of Ingraham Clock Company Information in "CTfile.pdf" (CT-DEP, 2009).

Site_Name	Source_date	Title	Pages
Ingraham Clock Company	April 6, 1998/October 1998	Ingraham information	112-113

## Radium

Radium was one of the first radioactive elements ever discovered. Marie and Pierre Curie unlocked the atom's secrets in 1898, opening the door for important innovations using radioactivity in medicine and industry. Radiation quickly became a consumer and medical sensation and radium was the posterchild. Experts concluded radiation was a lifesaver after finding it reduced tumor growth and was present in the waters at some health spas. Soon there were many radium products on the market that purported to improve health and vitality. But tragic stories began to emerge of the health impacts. Perhaps the most well-known is the "radium girls," who painted watch faces with glow-in-the-dark radium paint and developed infections and jaw cancer from licking their brushes into fine points.

### Early regulation

When evidence of harm began to emerge in the early 1900s, the states each made their own decisions about how to regulate. Courts also took varying approaches on victim compensation. The federal government took action to guard against false advertising and regulate mail shipments, conducted studies, and organized some voluntary protections.

As radioactive materials became more widely available following World War II, they remained largely under state control. Radium use declined in medical and consumer products in favor of other safer materials.

### Regulation today

Work on securing radioactive materials took on new urgency following the terrorist attacks on the United States in September 2001. Those attacks prompted the International Atomic Energy Agency to develop a code of conduct in 2004 to limit the potential for malicious acts. That code places one form of radium, known as radium-226, and other radioactive materials into categories based on their quantity and potential hazard.

The NRC has specific security requirements tied to these categories. As support for the IAEA code grew, Congress passed the Energy Policy Act in 2005, giving the NRC authority over radium-226. This law marked the first time the federal government had a comprehensive role in ensuring the safe use of radium-226.

Many states had developed strong programs for regulating radium and other naturally-occurring radioactive materials and it took time to transition authority. The NRC had regulations in place and fully assumed oversight in 2009. Initially, NRC staff worked exclusively with the military to identify sites

where radium might be present. These discussions made clear that the NRC's role would include ensuring that sites where radium was used are maintained in a way that protects public health and safety.

In 2016, the NRC and Department of Defense signed a [Memorandum of Understanding \(MOU\)](#) describing roles in the cleanup of radium and other unlicensed radioactive materials at military sites. The MOU and a [Regulatory Issue Summary](#) clarify NRC's jurisdiction over military radium. In late 2016, the NRC began monitoring two sites under the MOU: Treasure Island Naval Station in San Francisco and Dugway Proving Ground in Utah.

In 2013, the agency learned of two commercial sites where radium-226 had been found and other federal agencies had gotten involved. The Environmental Protection Agency was overseeing portions of the Waterbury Clock Company in Connecticut. The National Park Service was overseeing Great Kills Park in New York.

NRC staff is working with the current owner of the Waterbury Clock Company site. Contaminated areas of the site are under EPA oversight through its Brownfields Program, which provides assistance to clean up contaminated properties. NRC staff is working with EPA to clarify oversight roles and responsibilities under that program.

In 2016, NRC staff began developing an MOU with the National Park Service that will also clarify the NRC's jurisdiction over radium at Great Kills Park. The NRC is monitoring cleanup activities that the Park Service is implementing under Superfund, more formally known as the Comprehensive Environmental Response, Compensation and Liability Act.

Those projects prompted a search to identify sites in NRC's jurisdiction where radium was used, and to find out how much, if any, cleanup was done. This search was not a result of any known health and safety issues. Rather, because of its mandate to protect public health and safety, the NRC wanted to be sure there were no additional sites that might pose a risk.

With the help of the Oak Ridge National Laboratory, the NRC began to develop a fuller picture of commercial radium use. The lab produced a [catalog](#) of the various products developed and sold to the public in the early 20<sup>th</sup> century. By reviewing publicly available records, Oak Ridge identified sites where radium may have been used to make consumer goods. Then the lab looked for any cleanup records. Oak Ridge transmitted the results to the NRC in November 2015. Since that time, the agency has been working on plans to gather more information about those sites.

The NRC is working with state and local governments to identify any additional records that may help clarify whether any site cleanup has taken place. The goal is to ensure that public health and safety is adequately protected at these sites.

**October 2016**

## OTHER KEY OFFICES

- ◆ The **Office of Enforcement** develops policies and programs to enforce NRC requirements. Enforcement action is used as a deterrent to emphasize the importance of compliance with regulatory requirements and to encourage prompt identification and prompt, comprehensive correction of violations. The office manages major enforcement actions against licensees, and assesses the effectiveness and uniformity of enforcement actions taken by NRC regional offices. Enforcement powers include notices of violations, fines, and orders to modify, suspend or revoke a license. Two separate offices are responsible for investigations.
- ◆ The **Office of Investigations** conducts investigations of licensees, applicants, contractors and vendors. The office investigates all allegations of wrongdoing by individuals or organizations other than NRC employees and NRC contractors. In addition, the office keeps abreast of inquiries and inspections and advises on the need for formal investigations. It also keeps other components of the agency informed of matters under investigation as they affect safety.
- ◆ The **Office of the Inspector General** is a statutory post mandated by the Inspector General Amendments Act of 1988. The office conducts independent reviews and appraisals of internal NRC programs and conducts investigations of alleged wrongdoing by NRC employees and contractors.

## Office of Public Affairs

Washington, DC 20555-0001

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Website: [www.nrc.gov](http://www.nrc.gov)

## Regional Public Affairs Offices



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King of Prussia, PA 19406-2713  
(610) 337-5330 or 337-5331



### Region II

245 Peachtree Center Ave., NE., Suite 1200  
Atlanta, GA 30303-1257  
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(630) 829-9663 or 829-9662



### Region IV

1600 E. Lamar Blvd.  
Arlington, TX 76011-4511  
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NUREG/BR-0099, Rev. 14  
June 2016

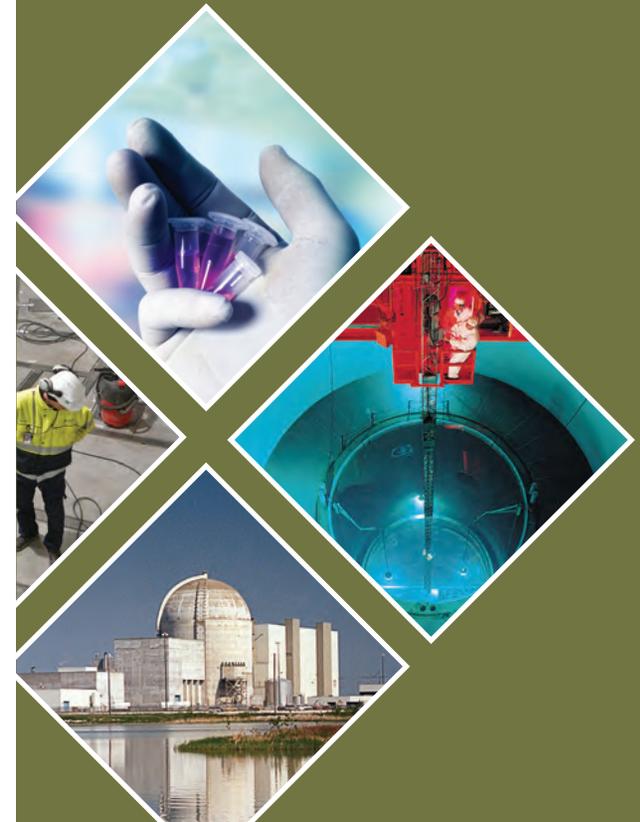
## STAY CONNECTED



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## U.S. Nuclear Regulatory Commission Overview



## NRC MISSION

The NRC licenses and regulates the Nation's civilian use of radioactive materials to protect public health and safety, promote the common defense and security, and protect the environment. Specifically, the NRC regulates commercial nuclear power plants; research, test and training reactors; nuclear fuel cycle facilities; and the use of radioactive materials in medical, academic and industrial settings.

The agency also regulates the transport, storage, and disposal of radioactive materials and waste, and licenses the import and export of radioactive materials. While the NRC only regulates industries within the United States, the agency works with agencies around the world to enhance global nuclear safety and security.

## STATUTORY AUTHORITY

The Energy Reorganization Act of 1974 created the NRC from the Atomic Energy Commission. The new agency was to oversee — but not promote — the commercial nuclear industry. The agency began operations on January 18, 1975. The NRC's regulations can be found in Title 10, "Energy," of the *Code of Federal Regulations* (10 CFR).

The NRC, its licensees (those licensed by the NRC to use radioactive materials), and the Agreement States (States that assume regulatory authority over use of certain nuclear materials) share a responsibility to protect public health and safety and the environment. Federal regulations and the NRC's regulatory program are key, but the primary responsibility for safely handling and using these materials lies with the licensees.



## ORGANIZATIONS AND FUNCTIONS

The NRC's Commission is made up of five members nominated by the President and confirmed by the U.S. Senate for 5-year terms. The President designates one member to serve as Chairman. The Chairman acts as the principal executive officer and spokesperson of the agency. The members' terms are staggered so that one Commissioner's term expires on June 30 every year. No more than three Commissioners can belong to the same political party.

The Commission formulates policies and regulations governing nuclear reactor and materials safety, issues orders to licensees, and adjudicates legal matters. The Executive Director for Operations carries out the policies and decisions of the Commission, and directs the activities of the program and regional offices. The NRC has about 3,600 employees and an annual budget of about \$1 billion.

The NRC is headquartered in Rockville, Md., and has four regional offices. The **Regional Offices** conduct inspection, enforcement (in conjunction with the Office of Enforcement), investigation, licensing, and emergency response programs. At least two NRC employees, called Resident Inspectors, are assigned to, and work out of, each nuclear power plant. The NRC also has a Technical Training Center in Tennessee.

The major program offices within the NRC include:

- ◆ **The Office of Nuclear Reactor Regulation.** Handles all licensing and inspection activities for existing nuclear power reactors and research and test reactors.
- ◆ **The Office of New Reactors.** Oversees the design, siting, licensing, and construction of new commercial nuclear power reactors.
- ◆ **The Office of Nuclear Security and Incident Response.** Oversees agency security policy for nuclear facilities and users of radioactive materials. It provides a safeguards and security interface with other Federal agencies and maintains the agency's emergency preparedness and incident response program.



◆ **The Office of Nuclear Material Safety and Safeguards.** Regulates activities and oversees the regulatory framework for the safe and secure production of commercial nuclear fuel and the use of nuclear material in medical, industrial, academic and commercial applications; uranium recovery activities; and the decommissioning of previously operating nuclear facilities. It regulates safe storage, transportation, and disposal of high- and low-level radioactive waste and spent nuclear fuel. The office also works with Federal agencies, States, and Tribal and local governments on regulatory matters.

- ◆ **The Office of Nuclear Regulatory Research.** Provides independent expertise and information for making timely regulatory judgments, anticipating problems of potential safety significance, and resolving safety issues. It helps develop technical regulations and standards and collects, analyzes, and disseminates information about the safety of commercial nuclear power plants and certain nuclear materials.

Three independent groups serve the Commission:

- ◆ **Advisory Committee on Reactor Safeguards,** mandated by statute, is a committee of scientists and engineers independent of NRC staff. They review and make recommendations to the Commission on all applications to build and operate nuclear power reactors, the safety aspects of nuclear facilities and the adequacy of safety standards. This includes update license amendments and license renewals.
- ◆ **Advisory Committee on the Medical Uses of Isotopes** is made up of physicians and scientists who consider medical questions and, when asked, give expert opinions to the NRC on the medical uses of radioactive materials.
- ◆ **Atomic Safety and Licensing Board Panel** provides a way for the public to get a full and fair hearing on civilian nuclear matters. Individuals who are directly affected by licensing action involving certain facilities producing or using nuclear materials may submit a request to participate in a hearing before these independent judges.

information. The enclosed Backgrounder provides more detail on the history of radium use and its potential health effects. The enclosed brochure provides an overview of the NRC.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

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Sincerely,

**/RA/**

John R. Tappert, Director  
Division of Decommissioning, Uranium Recovery  
and Waste Programs  
Office of Nuclear Material Safety  
and Safeguards

Docket Nos.: 3038979

Enclosures:

1. Site Summary Report
2. Radium Backgrounder
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