



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

October 6, 2016

Current Owner  
95 Johnson WTB, LLC  
95 Johnson Street  
Waterbury, CT 06710

**SUBJECT: LUX CLOCK COMPANY – 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 95 Johnson Street, Waterbury, Connecticut, is a site where radium-226 was previously used in the manufacturing of clocks with luminous radium dials until 1941, at which time it was used to make war related products. 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.

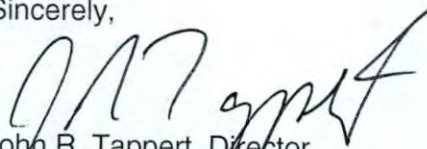
The enclosed Site Summary Report provides all of the information that the NRC has concerning historical radium storage at your property, which we found through a search of publicly available

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 No.: 3038982

Enclosures:

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

REGISTERED LETTER – RETURN RECEIPT REQUESTED

## **Lux Clock Company: Site Summary**

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

### **Address**

95 Johnson Street, Waterbury, CT

### **Site Description/History**

The Lux Manufacturing Company, formerly known as the Lux Clock Company, began manufacturing in 1914. The company produced clocks with luminous radium dials until 1941, at which time they made war related products.

In recent history, the building was occupied by the Lakewood Metals Division of Anchor Advanced Products, Inc., which manufactured aluminum and brass cosmetic packaging products (shells for lipstick tubes and bottle caps used on cologne and perfume containers). The building is currently vacant.

### **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)**

In 1998, the US EPA contacted the Agency for Toxic Substances and Disease Registry (ATSDR) to assist in conducting a public health assessment of structures that once housed clock factories in four Connecticut municipalities. The purpose of the health assessment was to evaluate the radiological survey data previously collected by the Connecticut Department of Environmental Protection (CT-DEP) at structures that once housed clock factories and to determine whether a public health hazard exists at any of these sites from the radiological contamination. The CT DEP requested assistance from the US Department of Energy (DOE) in conducting radiological surveys of the structures that once housed clock factories and the surveys were completed in April of 1998 (ATSDR, 1999).

For the former Lux Clock building, the 1999 ATSDR Public Health Assessment indicated isolated areas of radiological contamination on the first, second, and third floors. Scattered contamination on the fourth floor was detected with fixed and loose material containing elevated levels of radiation (Table 1; at the time of the 1998 survey Anchor Advanced Products occupied the building). ATSDR concluded that radiological contamination was detected at levels that may pose a public health hazard to occupants of the former Lux Clock Company building; however, ATSDR stated that none of the radiation levels detected pose an immediate health problem. The Connecticut Department of Public Health recommended that individuals be disassociated from areas with radiation at levels exceeding 15 mrem/year.

Table 1. 1998 Radiological Survey Results for the former Lux Clock Company Building (ATSDR, 1999)

Town: Waterbury Clock Company Name: Lux Clock Company Current Occupant(s): Anchor Advanced Products

| Radiological Parameters (units) | Location  | Measurement Description               | Maximum Level | Background | CL |
|---------------------------------|-----------|---------------------------------------|---------------|------------|----|
| Gamma radiation (uR/hr)         | 1st floor | Direct contact                        | 20            | 10         | 15 |
|                                 | 2nd floor | Direct contact                        | 20            |            |    |
|                                 | 3rd floor | Direct contact                        | 30            |            |    |
|                                 | 4th floor | Direct contact                        | 140           |            |    |
| Alpha Beta activity(dpm)        | 1st floor | Measurement of Loose Material (Smear) | not measured  | NR         | 20 |
|                                 | 2nd floor | Measurement of Loose Material (Smear) | not measured  | NR         |    |
|                                 | 3rd floor | Measurement of Loose Material (Smear) | not measured  | NR         |    |
|                                 | 4th floor | Measurement of Loose Material (Smear) | 150           | NR         |    |

**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**

This original facility is currently vacant. It should be noted that there are residential areas (Figure 1) within close proximity to the former clock company.

Waterbury, a city in New Haven County, CT, is on the Naugatuck River, 33 miles southwest of Hartford and 77 miles northeast of New York City. According to the 2010 U.S. Census, the population of Waterbury was 110,366; the 2014 population estimate for the city was 109,307 (United States Census Bureau, 2015).





Figure 1. Location of Lux Clock Company (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 money was used for cleanup at the former Lux Clock Company site.

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

The building is currently vacant and for sale.



Figure 2. Lux Clock Company (95 Johnson Street) (Google Earth, 2015)

### **Existing Engineering Controls**

Based on Figures 2-4 (2015 Google Earth), the former Lux Clock building is surrounded by fencing. There are areas, however, where the fence is missing, and Figure 4 shows a car and truck in the parking lot, indicating that the fence may not be keeping people out of the building.





Figure 3. Entrance to old Lux Clock Company (Google Earth, 2015)



Figure 4. Shipping entrance to former Lux Clock Company (Google Earth, 2015)

## Prioritization Ranking

Radium is confirmed to have been present at the site based on historical documentation and radiological surveys. The site consists of a building that is potentially contaminated by radium. The building is not occupied. Site access is weakly controlled. Therefore, the site is classified as Tier 2.

## References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Public Health Implications of Radiation Contamination at Former Clock Factories Located in Bristol (Hartford County), New Haven (New Haven County), Thomaston (Litchfield County), and Waterbury (New Haven County) Connecticut. January 29, 1999. <http://www.atsdr.cdc.gov/HAC/pha/PHA.asp?docid=959&pg=0>

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. 1998. Former Clock Factory Sites in Waterbury: Update. September 1998. [http://www.ct.gov/dph/lib/dph/environmental\\_health/eoha/atsdr/waterbury\\_clock\\_update.pdf](http://www.ct.gov/dph/lib/dph/environmental_health/eoha/atsdr/waterbury_clock_update.pdf)

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

United States Census Bureau. Accessed October 2015. <http://quickfacts.census.gov/qfd/states/09/0980000.html>.



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

| Site_Name         | Source_date           | Title   | Pages                           |
|-------------------|-----------------------|---|---------------------------------|
| Lux Clock Company | April 21, 1998        | Department of Energy (DOE) Radiological Assistance Report cover letter and Radiological Assistance Call notes   | 744-747                         |
| Lux Clock Company | January 29, 1999      | PUBLIC HEALTH ASSESSMENT; PUBLIC HEALTH IMPLICATIONS OF RADIATION CONTAMINATION AT FORMER CLOCK FACTORIES LOCATED IN BRISTOL (HARTFORD COUNTY), NEW HAVEN (NEW HAVEN COUNTY), THOMASTON (LITCHFIELD COUNTY), AND WATERBURY (NEW HAVEN COUNTY) CONNECTICUT | 1578-1619                       |
| Lux Clock Company | May 1 - June 25, 1999 | Scope of Work, Remediation of Radium Impacted Areas Third and Fourth Floors of Site Building 95 Johnson Street, Waterbury, CT   | 1491-1500, 1518-1521, 1526-1544 |

## 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

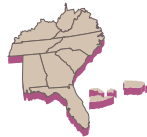
Washington, DC 20555-0001  
Telephone: (301) 415-8200  
Fax: (301) 415-3716  
E-mail: [opa.resource@nrc.gov](mailto:opa.resource@nrc.gov)  
Website: [www.nrc.gov](http://www.nrc.gov)

## Regional Public Affairs Offices



### Region I

2100 Renaissance Blvd., Suite 100  
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  
(404) 997-4417 or 997-4416



### Region III

2443 Warrenville Road, Suite 210  
Lisle, IL 60532-4352  
(630) 829-9663 or 829-9662



### Region IV

1600 E. Lamar Blvd.  
Arlington, TX 76011-4511  
(817) 200-1128



NUREG/BR-0099, Rev. 14  
June 2016

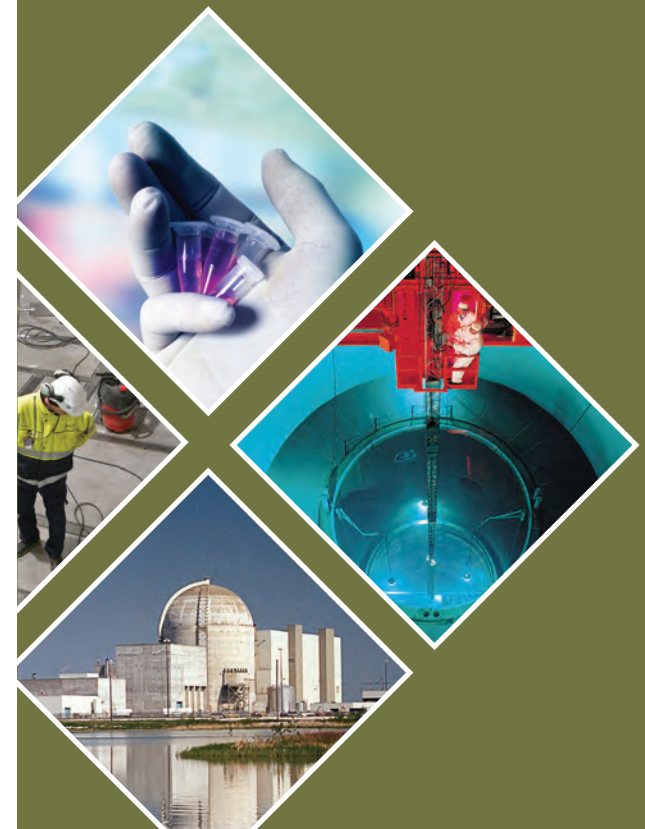
## STAY CONNECTED



©NRCgov



## 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

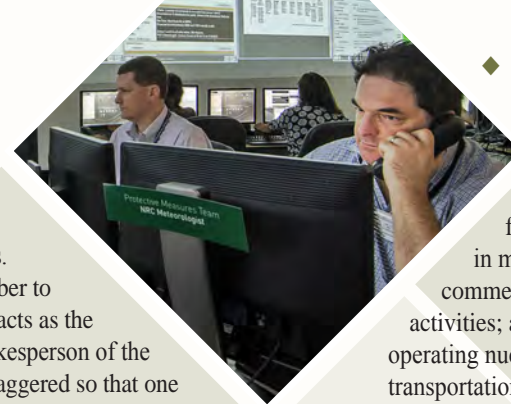
The NRC's Commission is made up of five members nominated by the President and confirmed by the U.S. Senate for 5-year terms. The President designates one member to serve as Chairman. The Chairman acts as the principal executive officer and spokesperson of the agency. The members' terms are staggered 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>.

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,

**/RA/**

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

Docket No.: 3038982

Enclosures:

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

REGISTERED LETTER – RETURN RECEIPT REQUESTED

**DISTRIBUTION:**

RidsRgn1MailCenter                      R. Powell, RI                      T. Jackson, RI                      D. Misenhimer, NMSS

**ADAMS Accession No.: ML16277A195 (Pkg); ML16277A312 (Ltr)**

|               |             |            |            |            |                 |            |
|---------------|-------------|------------|------------|------------|-----------------|------------|
| <b>OFFICE</b> | DUWP/MDB/PM | DUWP/LA    | RI/DNMS    | OGC (NLO)  | DUWP/MDB/BC (A) | DUWP/D     |
| <b>NAME</b>   | JWhited     | SAchten    | R. Powell  | TCampbell  | MMeyer          | JTappert   |
| <b>DATE</b>   | 09/27/2016  | 09/27/2016 | 09/28/2016 | 10/06/2016 | 10/01/2016      | 10/06/2016 |

**OFFICIAL RECORD COPY**