



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, ILLINOIS 60532-4352

April 5, 2019

EA-18-172

Ms. Peggy Maniates, Executive Director  
USS Silversides Submarine Museum  
1346 Bluff Street  
Muskegon, MI 49441

SUBJECT: USS SILVERSIDES SUBMARINE MUSEUM — RESULTS OF THE  
U.S. NUCLEAR REGULATORY COMMISSION'S INITIAL SITE VISIT AND  
REQUEST FOR CONFIRMATION OF VOLUNTARY CONTROLS; EXERCISE OF  
ENFORCEMENT DISCRETION

Dear Ms. Maniates:

I am writing to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's initial site visit to the property at 1346 Bluff Street, Muskegon, Michigan, performed on October 23, 2018. The results are summarized below and are discussed in further detail in the enclosed report.

During the initial site visit, the staff conducted radiation surveys over approximately 70 percent of the areas inside the USS Silversides Submarine. The staff did not survey the museum buildings outside the submarine.

As was discussed with you during our initial site visit, the staff identified a number of instruments and other components (luminous items or products) installed in the submarine that contained radium-226. In accordance with our regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 31.12(a)(3), *General license for certain items and self-luminous products containing radium-226*, the Museum is considered a General Licensee for the possession of these items installed in the submarine, a marine vehicle. Under this regulation, there is no limit on the quantity of luminous items installed in a marine vehicle that may be possessed.

Also during our initial site visit, the staff identified one box of damaged gauges and one uninstalled gauge, not in the box, containing radium-226 in a locked storage room in the submarine. The total number of gauges in the room was estimated to be less than 10. There was also a small area of contamination on the inside of the box. Our measurements indicate that the exposure level from the box did not exceed the action level at industrial use locations, as discussed in the NRC's Temporary Instruction 2800/043<sup>1</sup> for recommending limiting routine access, and even with conservative assumptions, a member of the public regularly working in this area would not receive an annual dose in excess of 25 millirem per year, the limit for unrestricted use, found in 10 CFR 20.1402, *Radiological criteria for unrestricted use*. To prevent

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<sup>1</sup>Agencywide Documents Access and Management System (ADAMS) Accession No. ML16330A678

the possible spread of contamination from inside the box you agreed to maintain the box and gauges in the locked storage room and instruct Museum personnel not to disturb the box.

Up to 100 luminous products (e.g., gauges, compasses, inclinators, circuit breakers) may be possessed under a general license in accordance with 10 CFR 31.12(a)(4). Based on the total number of uninstalled luminous products being less than 100, USS Silversides Submarine Museum is also considered a General Licensee for these items.

As a General Licensee, USS Silversides Submarine Museum must comply with certain requirements under 10 CFR 31.12(c), which include that it:

- (1) Must notify the NRC should there be any indication of possible damage to the product so that it appears it could result in a loss of the radioactive materials. A report containing a brief description of the event, and the remedial action taken, must be furnished to the Director of the Office of Nuclear Material Safety and Safeguards (NMSS), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001 within 30 days.
- (2) Must not abandon products containing radium-226. The product, and any radioactive material from the product, may only be disposed of in accordance with 10 CFR 20.2008, *Disposal of certain byproduct material*, or by transfer to a person authorized by a specific license to receive the radium-226 in the product or as otherwise approved by the NRC.
- (3) Must not export (i.e., transfer to a person or an international organization in a foreign country) products containing radium-226 except in accordance with 10 CFR Part 110, *Export and Import of Nuclear Equipment and Material*.
- (4) Must dispose of products containing radium-226 only at a disposal facility authorized to dispose of radioactive material in accordance with any Federal or State solid or hazardous waste law, including the Solid Waste Disposal Act, as authorized under the Energy Policy Act of 2005, by transfer to a person authorized to receive radium-226 by a specific license issued under 10 CFR Part 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*, or equivalent regulations of an Agreement State, or as otherwise approved by the NRC.
- (5) Must respond to written requests (including this request) from the NRC to provide information relating to the general license within 30 calendar days of the date of the request, or other time specified in the request. If you cannot provide the requested information within the allotted time, you must, within that same time period, request a longer period to supply the information. A written justification for the request must be provided to the Director of NMSS by means of an appropriate method listed in 10 CFR 30.6(a).

As discussed in the enclosure, the NRC staff identified a box containing several damaged radium gauges and a small area of contamination on the inside of the box, indicating a loss of radioactive material. However, you had not reported this damage to the NRC, as required in 10 CFR 31.12(c)(1). Based on this discovery, the staff determined that a violation of NRC requirements, as stated above in item (1), occurred.

The violation of 10 CFR 31.12(c)(1) for not reporting the damaged items was evaluated in accordance with the NRC Enforcement Policy and has been characterized at Severity Level III, a violation that could have resulted in moderate safety or security consequences. However, I have

been authorized, after consultation with the Director, Office of Enforcement, to exercise enforcement discretion in this case in accordance with Section 3.5, "Violations Involving Special Circumstances," of the Enforcement Policy. Consistent with the applicable guidance in Enforcement Guidance Memorandum (EGM) 09-004, "Interim Guidance for Dispositioning Violations of Naturally Occurring and Accelerator-Produced Radioactive Materials (NARM) Requirements,"<sup>1</sup> the NRC will not cite the violation because: (1) the failure did not result in an actual safety, health, or security consequence; (2) the failure was not willful; (3) a reasonable argument was provided that the USS Silversides Submarine Museum was not aware that the new requirement was applicable; and (4) you committed to comply with general license requirements in 10 CFR 31.12. The current Enforcement Policy is included on the NRC's website <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

If you contest this action or its significance, a response must be provided within 30 days of the date of this letter, with the basis for denial and/or corrected information, to the NRC, ATTN.: Document Control Desk, Washington, D.C. 20555-0001, with a copy to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Please note that the exercise of enforcement discretion applies only to the damaged items as identified by the staff during the initial site visit on October 23, 2018. USS Silversides Submarine Museum is required to follow 10 CFR 31.12(c)(1) and notify the NRC should there be any indication of possible additional damage to or changes to the state of the products now in its possession, should additional gauges be received or acquired in the future that have indication of possible damage, or if any other products are identified. Should additional damage be identified, a report containing a brief description of the event, and the remedial action taken, must be submitted to the Director, NMSS within 30 days of the date of identification, as described in detail above.

In accordance with 10 CFR 31.12(c)(5), the staff requests the following information within **120 days** of the date of this letter:

- (1) Plans for either continued possession of the damaged radium gauges and the contaminated storage box, or disposition of the items.
- (2) Confirmation of the actions that you are taking to control the spread of contamination and access to the damaged gauges and contaminated box. During the site, you agreed to place the gauges in a locked storage room and instruct Museum personnel not to disturb the box.

With respect to the elevated activity above background in the box of broken radium gauges, these levels indicate that, even with conservative assumptions, a member of the public regularly working in this area would not receive an annual dose in excess of 25 millirem per year, the limit for unrestricted use found in 10 CFR 20.1402. With respect to the other, intact uninstalled gauges that were found in a locked storage room on the submarine, the staff determined that, based on the low levels of radium measured on the items, there are no immediate health and safety concerns at this site.

As part of any voluntary cleanup effort, we recommend that you consult an NRC or Agreement State specifically licensed service provider to ensure that adequate measures are taken to limit the potential spread of radiological contamination. If you dispose of the gauges and other items,

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<sup>1</sup>ADAMS Accession No. ML091240060

a licensed service provider should be utilized to conduct any packaging of radioactive waste for transport.

Please be aware that any remediation activities pursued at your site may also have to meet any State of Michigan requirements and standards. As previously discussed, any voluntary site cleanup is the financial responsibility of the site owner.

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's Public Document Room or from the Publicly Available Records component of NRC's ADAMS. ADAMS is accessible from the NRC's website at <http://www.nrc.gov/reading-rm/adams.html>.

We will be contacting you in the near future to discuss this letter and report. Please contact Mr. Mike Kunowski, Chief, Materials Control, ISFSI, and Decommissioning Branch, at 630-829-9618, or Mr. Bill C. Lin, Health Physicist, at 630-829-9829, should you have any questions in the interim.

Sincerely,

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David L. Pelton, Director  
Division of Nuclear Materials Safety

Docket No. 03039143

Enclosure:  
Initial Site Visit Summary for USS Silversides  
Submarine Museum

Letter to Peggy Maniates from David Pelton dated April 5, 2019.

**SUBJECT: USS SILVERSIDES SUBMARINE MUSEUM — RESULTS OF THE U.S. NUCLEAR REGULATORY COMMISSION'S INITIAL SITE VISIT AND REQUEST FOR CONFIRMATION OF VOLUNTARY CONTROLS; EXERCISE OF ENFORCEMENT DISCRETION**

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**\*review & concurrence received via e-mail**

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**Enclosure**

**INITIAL SITE VISIT SUMMARY FOR USS SILVERSIDES SUBMARINE MUSEUM**

**1346 BLUFF STREET, MUSKEGON, MICHIGAN**

**OCTOBER 23, 2018**

Enclosure

## Summary of Activities for October 23, 2018

### 1.0 INTRODUCTION

The Energy Policy Act of 2005 amended section 11e.(3) of the Atomic Energy Act of 1954 to place discrete sources of radium-226 (Ra-226) under NRC regulatory authority as byproduct material. Prior to this, the State of Michigan had regulatory responsibility for discrete sources of Ra-226. Following the enactment of the Energy Policy Act, the NRC was provided information from the State of Michigan that the submarine at the USS Silversides Submarine Museum had discrete sources of Ra-226. The objectives of this initial site visit by the NRC at the Museum on October 23, 2018, were to determine if discrete sources of Ra-226 and/or distributed Ra-226 contamination from discrete sources were present, to determine if there are any current health and safety concerns, and to determine if further action by NRC is needed. Surveys during this visit were performed as described in NRC's procedure, Temporary Instruction (TI) 2800/043, "Inspection of Facilities Potentially Contaminated with Discrete Radium-226 Sources."

Survey data collected during initial site visits are used either to eliminate sites from future NRC consideration or to plan future actions that may be needed to reduce Ra-226 exposure to current or future site occupants to levels that do not exceed the applicable regulatory requirement. It is important to note that destructive testing, for example taking samples of wall or floor sub-surfaces, is not generally performed, as described in TI 2800/043.

### 2.0 SITE OBSERVATIONS AND FINDINGS

NRC staff (B. Lin, Region III, Decommissioning Health Physics Inspector, and J. Giessner, Division Director) visited the USS Silversides Submarine Museum at 1346 Bluff Street in Muskegon, Michigan on October 23, 2018. The Museum consists of several buildings and a restored World War II submarine. The NRC personnel met briefly with the Museum manager for introductions and reiteration of the purpose of visit, which had been explained via a previous telephone conversation between Mr. Lin and the Museum manager. After this meeting, the NRC staff proceeded to survey the submarine to identify any discrete sources of Ra-226. Approximately 70 percent of the accessible interior area of the submarine was surveyed.

For the surveys, the NRC used a survey meter with a Sodium Iodide (NaI) detector and one with a Geiger-Mueller detector. The staff identified a number of components (instruments, such as compasses and gauges) containing Ra-226 installed in the submarine. For example, figure 1 below shows two gauges containing Ra-226, figure 2 shows a compass containing Ra-226, and figure 3 shows an inclinometer containing Ra-226.



Figure 1. Radium Gauges





Figure 2. Radium Compass



Figure 3. Radium Inclinator

In addition to the items installed in the submarine itself, the NRC staff identified one intact and uninstalled gauge containing Ra-226 and a box containing less than approximately 10 other gauges in a locked storage room under the submarine's main eating area (i.e., the galley). Of

the gauges in the box, at least two were damaged (the gauges were wrapped but noise of loose glass pieces was heard when the NRC handled the wrapped items). NRC staff measured radiation readings approximately one meter from the box and these readings were at background. The NRC did identify a small area of contamination on the inside of the box that apparently came from one or more of the damaged gauges. No other contamination was found in the storage room or in the submarine.

At the conclusion of the initial site visit, the NRC personnel discussed the survey results with the Museum manager, who verbally committed to keep the box of broken radium gauges in its current state and separated from the main working area, that no work would be performed on any installed or uninstalled radium gauges, and that no additional radium gauges would be received. The NRC staff discussed with the manager the various sections of 10 CFR 31.12, “General license for certain items and self-luminous products containing radium-226.” The manager, who was not familiar with NRC regulations, agreed to comply with the sections appropriate to the Museum.

### **3.0 CONCLUSION**

NRC staff conducted an initial site visit at the USS Silversides Submarine Museum in Muskegon, Michigan, on October 23, 2018. The NRC identified a number of discrete sources of Ra-226 in the form of gauges/indicators installed in various locations in the submarine and several gauges stored in a box, and one uninstalled gauge not stored in the box, in a locked storage room in the submarine. The NRC staff also identified a small area of distributed Ra-226 contamination on the inside of the box in storage. The NRC estimated the number of gauges in the box as less than 10, of which at least two were damaged. Because the gauges were wrapped and contamination was identified as being present inside the box, the NRC did not unwrap the gauges or move them around to obtain an exact count. No other contamination was found in the storage room or elsewhere in the submarine and none of the gauges installed in the submarine were damaged.

The general license provisions of 10 CFR 31.12(a)(3) allow the Museum to possess the radium-bearing components (luminous items or products) because they are installed in a “marine” vehicle—the submarine. The NRC did not identify any radiological concerns with the installed gauges.

The general license provisions of 10 CFR 31.12(a)(4) allow the Museum to possess up to 100 radium-bearing items (luminous items or products) not installed in a vehicle. The Museum, with its approximately 10 or less uninstalled gauges, met this provision of the regulation. Radiologically, the NRC did not identify any concerns with the general area dose rates in the storage room where the one uninstalled gauge and the box of gauges were found; however, the contamination on the inside of the box and presence of at least two damaged gauges in the box present a potential for spreading contamination into the room if the box and its contents were to be disturbed. The NRC staff discussed this potential with the Museum manager who agreed to maintain the storage room locked and to instruct Museum personnel not to disturb the box.

The general license provisions of 10 CFR 31.12(c)(1) specify that general licensees, like the Museum, notify the NRC should there be any indication of possible damage to the product (i.e., gauges) so that it appears it could result in a loss of the radioactive material. Museum personnel were unaware of this provision and no notification of the NRC had been made.

Based on the results of this initial site visit, which identified only a small amount of

contamination of Ra-226 and at least two damaged radium gauges in a box in a locked storage area on the submarine, no additional onsite activities by NRC personnel are warranted. The NRC will maintain contact with Museum personnel to ensure the damaged gauges and contaminated box are properly dispositioned.