

June 18, 1997

SECY-97-128

FOR: The Commissioners

FROM: L. Joseph Callan /s/  
Executive Director for Operations

SUBJECT: REMOVAL OF THE ARMY RESEARCH LABORATORY PORTION OF THE  
WATERTOWN  
ARSENAL/MALL SITE FROM THE SITE DECOMMISSIONING MANAGEMENT PLAN

PURPOSE:

To inform the Commission that remedial action has been completed at the Army Research Laboratory (ARL) portion of the Watertown Arsenal/Mall site in Watertown, Massachusetts, and that the staff plans to: a) release the ARL for unrestricted use; b) terminate two of the three current Nuclear Regulatory Commission licenses for the site; c) amend the third NRC license to remove the ARL as an authorized location of use; and d) remove the ARL portion of the Watertown Arsenal/Mall site from the Site Decommissioning Management Plan (SDMP).

SUMMARY:

The U.S. Army (Army) conducted operations involving licensed radioactive material at the ARL from the 1940's to 1991. Current ARL operations involving radioactive material are conducted under one of three radioactive materials licenses issued by NRC. The licensee began decommissioning the facility in 1991 and completed decommissioning in 1996. Based on the remedial actions taken by the licensee, the staff's review of the licensee's radiological surveys, and the results of the NRC's confirmatory survey, the staff has concluded that the licensee has removed radioactive material attributable to licensed operations to levels that are suitable for unrestricted use.

CONTACT: M. Bouwens, Region I  
(610) 337-6910 Attachment 1 summarizes licensed operations and decommissioning activities at

the site. The staff will terminate the byproduct material and special nuclear material licenses and will amend the source material license to remove ARL as an authorized location of use on the license. Decommissioning activities will continue at the property referred to as the Mall Property (which was formerly part of the Watertown Arsenal) under the amended source material license, and the Mall Property will remain on the SDMP.

#### CONCLUSIONS:

Based on the results of the remedial actions taken by ARL and the staff review of the docket files, radiological survey reports, and the NRC confirmatory survey, the staff concludes that decommissioning has been satisfactorily completed at the ARL portion of the Watertown Arsenal/Mall site in Watertown, Massachusetts. The ARL meets the NRC criteria described in the SDMP Action Plan for release for unrestricted use.

The staff has notified representatives of the U.S. Environmental Protection Agency (EPA) and the Commonwealth of Massachusetts of its intent to terminate two of the licenses issued to ARL and to remove the site as an authorized location of use from the third license. The EPA and the Commonwealth of Massachusetts do not plan further action regarding the NRC-licensed materials at the site.

The staff published a notice in the Federal Register on April 23, 1997, (62 FR 19824) stating that the site meets NRC criteria for unrestricted use, and that the NRC intends to remove the ARL from the SDMP, terminate two of the licenses, and remove the site as an authorized location of use from the third license.

It is the staff's intention, unless otherwise directed by the Commission, to send a letter to ARL (Attachment 2) stating that: a) the Watertown ARL site meets current NRC requirements for release for unrestricted use; b) the byproduct material and special nuclear material licenses have been terminated; c) the site was removed as an authorized location of use from the source material license; and d) NRC intends to remove the ARL from the SDMP.

The source material license will remain active only to authorize decommissioning activities to be conducted at the Mall Property, and the Mall Property will remain on the SDMP.

COORDINATION

The Office of the General Counsel has reviewed this paper and has no legal objection.

L. Joseph Callan  
Executive Director  
for Operations

Attachments:

1. Summary of Licensed Operations and Decommissioning Activities
2. Draft letter to the Army Research Laboratory

Summary of Licensed Operations and Decommissioning  
Activities at the Watertown Arsenal/Mall Site

In SECY-90-121, the original Site Decommissioning Management Plan (SDMP), and in subsequent revisions to the SDMP, the staff identified approximately 50 sites that warranted special NRC oversight to ensure the safe and timely remediation of residual radioactive material in excess of NRC's criteria for unrestricted use. One of these sites is the Watertown Arsenal/Mall in Watertown, Massachusetts. The staff added this site to the SDMP because:

- a) the site has several large buildings that required significant remediation;
- b) the history of licensed activities at the site indicated a potential for soil contamination;
- and c) because the portion of the facility known as the Mall Property has unlicensed buildings (or building remnants) and sewers that were potentially contaminated with radioactive material from previously licensed activities.

The Watertown Arsenal/Mall SDMP site in Watertown, Massachusetts encompasses approximately 37 hectares (92 acres) along the north branch of the Charles River, approximately 11 km (7 miles) west of Boston, Massachusetts. The Watertown Arsenal was established in 1816 by the Army and, at that time, included what is now referred to as the Mall Property. The Watertown Arsenal was initially used for storing, cleaning, repairing, and issuing small arms and ordnance supplies. In 1830, the facility was also used for manufacturing guns, gun carriages, and ammunition. In the 1880s, materials testing and experimentation began at the Watertown Arsenal. Major activities during this time included mixing paint and preparing lubricants and ingredients for pyrotechnics. In the 1900s, weapon manufacturing was expanded to include the production of field and breech-loaded, steel siege guns and carriages, coast artillery, 280-millimeter cannons, and antiaircraft guns.

In 1968, the facility was partitioned into two parcels. The eastern half, referred to as the Mall Property, was designated as excess property by the Government Services Administration and sold to the town of Watertown. The property was subsequently developed and now includes the Arsenal Mall. The western half of the property remained under the control of the Army and was renamed the Army Materials and Mechanics Research Center (AMMRC). In 1986, the AMMRC was renamed the Army Materials Technology Laboratory (MTL), and was subsequently renamed the Army Research Laboratory in 1993. The ARL is the portion of the Watertown Arsenal/Mall SDMP site that the staff plans to release for unrestricted use and remove from the SDMP.

The ARL facility encompasses approximately 14.8 hectares (36.5 acres) and is bordered by parks, condominiums, commercial and residential properties, and the Charles River. An additional 4.5-hectare (11-acre) parcel along the Charles River is part of the ARL property, but is operated as a park by the Commonwealth of Massachusetts. Radiological surveys were also conducted in the park area, but, because residual radioactive material was not identified in excess of NRC's criteria for unrestricted use, remedial activities

were not  
required.

Beginning in the mid-1940s, depleted uranium (DU) operations were conducted in various buildings at the ARL. Development of DU artillery projectiles began at the ARL in the early 1950s. The DU operations at the ARL involved machining, ballistics testing, chemical research, and incineration.

Attachment 1 The  
machining of DU involved grinding, milling, heat-treating, melting, cutting, drilling, electrochemical plating, and polishing. Although the principal radioactive material used at the ARL was DU, the facility also possesses a byproduct material license and a special nuclear material license, in addition to its source material license. As a result of the enactment of the Base Closure and Realignment Act [Public Law 100-526], the ARL was required to be closed by September 1995. The licensee ceased operations with DU, byproduct material, and special nuclear material in the early 1990s and commenced decommissioning activities in 1991.

The Army conducted a Radiological Field Survey from October 1991 to January 1992 to determine the radiological status of buildings and grounds at the ARL. The buildings at the facility were classified from historical information as either "contaminated," "suspected" (of being contaminated), or "not suspected" (of being contaminated). A total of eighteen buildings were classified and surveyed. Nine of the buildings were categorized as either "contaminated" or "suspected." The grounds were divided into "suspected" and "not suspected" areas. The "suspected" area for the grounds included an approximately 9-meter (30-foot) area surrounding each of the nine "contaminated" and "suspected" buildings.

The results of the Radiological Field Survey indicated that all of the contamination present at the ARL facility was DU. Radiological contamination was identified in 7 of the 18 buildings that were surveyed. All seven

buildings had been categorized as either "contaminated" or "suspected."  
The majority of the contamination was identified in Buildings 43 and 312. Building 43 was used for forging, machining, and incinerating DU. The surveys revealed widespread fixed contamination on the floor with activities exceeding 200,000 dpm/100 cm<sup>2</sup>. An iron rafter over the incinerator had surface contamination levels as high as 4 million dpm/100 cm<sup>2</sup>. The painted surfaces of the brick walls and other rafters in the vicinity of the incinerator were also significantly contaminated. The exterior surfaces of pipes, electrical conduit, and at least three drains were contaminated.

Machine shops and associated workshops in Building 312 were contaminated with DU and beryllium. There was widespread fixed and removable DU contamination on the floor in the machine shops and the plating shop. Surface contamination levels on the floor were as high as 1 million dpm/100 cm<sup>2</sup>. The painted plaster wall surfaces in the machine shops were also contaminated. Twenty-eight drains in the machine shops and the plating shop were identified with fixed contamination. Surveys on the third floor of the building identified significant contamination in the vacuum exhaust system that served the machine shops. The Radiological Field Survey of the exterior areas did not identify any radiological contamination.

Surveys and sampling conducted during decommissioning activities identified additional areas at the ARL that required remediation. These surveys also identified Cesium-137 (<sup>137</sup>Cs), Cobalt-60 (<sup>60</sup>Co), Hydrogen-3 (<sup>3</sup>H, tritium), and natural uranium contamination. <sup>137</sup>Cs was identified in soil at some building downspout discharge locations. The <sup>137</sup>Cs activity was apparently due to global fallout that had been washed off the large roofs of the buildings by rainwater and had concentrated at discharge points from the gutter system of the buildings. The <sup>60</sup>Co contamination was identified on a piece of material found in an area of Building 97 where a neutron generator was operated. The material contaminated with <sup>60</sup>Co was an isolated piece of neutron-activated

material from a neutron generator target. Tritium was identified in Building 97 in areas also associated with a neutron generator. Natural uranium, resulting from machining operations conducted in the early licensed history of the facility, was identified in the soil under the floors in Buildings 43 and 312 and in isolated exterior areas. As a result of the additional surveys and sampling analyses, contamination was identified in all nine buildings that were previously categorized as "contaminated" or "suspected" in the 1991 Radiological Field Survey.

In June 1992, the licensee began remediating the nine buildings and the isolated exterior areas where contamination was identified. The majority of the remediation activities were conducted in Buildings 43 and 312. Remediation activities included general washing and cleaning of floors and walls; removal and disposal of contaminated drains, pipes, floor tile, ventilation systems, soil, and concrete floors; and emptying and decontamination of cisterns and sumps. Cleaning and removal techniques for the contaminated structures included vacuuming, wipe-downs, hydrowashing, hydrolazing, CO2 pellet blasting, scabbling, chiseling, chip hammering, jackhammering, diamond-wire saw cutting, and demolition. Approximately 95,000 cubic feet (2,690 cubic meters) of solid radioactive waste (including approximately 10,000 cubic feet (283 cubic meters) of mixed waste) were generated during facility decommissioning activities. Waste was packaged in containers appropriate for the waste class and disposed of at a licensed disposal facility.

A final survey, approved by the NRC, was conducted in the nine buildings where remediation activities were conducted. The licensee used the guidance in NUREG/CR-5849 as a basis for the final survey plan for these buildings. Because there was no history of radioactive materials use in the remaining nine buildings, and the 1991 Radiological Field Survey did not identify radiological contamination in these buildings, the 1991 Radiological Field Survey was used as the final survey in these buildings. The results of the licensee's final survey of the ARL indicate that the activity and concentrations of residual radioactive material, attributable to licensed operations, on surfaces and in soil, meet the release criteria specified in the licensee's approved Decommissioning Plan.

NRC conducted a confirmatory survey at ARL in March 1996. The confirmatory

survey focused primarily on Buildings 43 and 312, but also included the other 16 buildings included in the Radiological Field Survey. The results of the confirmatory survey are in agreement with the licensee's final survey data. Region I staff reviewed the Final Survey and the Confirmatory Survey data and concluded that the ARL facility meets NRC guidelines for unrestricted use. Region I staff also reviewed correspondence and radiological surveys in the files relating to the Mall Property. Based on this review, the staff determined that portions of buried drain lines on the Mall Property may not have been adequately assessed for residual depleted uranium contamination. The staff has determined that the potential contamination to the buried drain lines is not an immediate safety issue and the staff is working with the Army and the Army Corps of Engineers to address these areas through additional radiological surveys. The Mall Property will remain on the SDMP until the staff surveys are resolved.

Mr. Kenneth F. Worth  
Site Operation Director  
Department of the Army  
U.S. Army Research Laboratory  
ATTN: AMSRL-OP-WT  
Caretaker Force  
395 Arsenal Street  
Watertown, MA 02172-2700

SUBJECT: REMOVAL OF THE WATERTOWN ARSENAL, WATERTOWN, MASSACHUSETTS SITE  
FROM THE NRC SITE DECOMMISSIONING MANAGEMENT PLAN

Dear Mr. Worth:

This is in reference to your letters dated September 9, 1993, May 7, 1996, and September 24, 1996, requesting that the U.S. Nuclear Regulatory Commission terminate the Army Research Laboratories NRC License Nos. 20-01010-04, SUB-238, and SNM-244, respectively, and release the Army Research Laboratory (Watertown Arsenal) site for unrestricted use.



We have reviewed your reports from the radiological surveys and analysis of soil samples and conducted our own radiological survey. We conclude that all remediated areas at the facility meet the criteria for release for unrestricted use as discussed in the "Action Plan to Ensure Timely Cleanup of Site Decommissioning Management Plan Sites" (the Action Plan) (57 FR 13389-13392) and NRC's current surface and soil contamination criteria.

On that basis, we removed the Watertown Arsenal (ARL), Watertown, Massachusetts site from the SDMP list and terminated License Nos. 20-01010-04 and SNM-244, and removed the ARL facility as a location of use from License No. SUB-238. The SUB-238 license was amended, and will remain active, to authorize decommissioning activities conducted at the Mall Property. Please find enclosed Amendment Nos. 45, 15, and 30 for License Nos. 20-01010-04, SUB-238, and SNM-244, respectively. The facility at 395 Arsenal Street, Watertown, Massachusetts may be released for unrestricted use. Further remedial action is not required.

As noted in the Action Plan, this is the Commission's final action, with respect to the ARL facility, on the referenced licenses. NRC will not require any additional decommissioning in response to future NRC criteria or standards, unless additional contamination, or noncompliance with the Decommissioning Plan submitted to NRC in April 1992, as amended, is found, indicating there is a significant threat to public health and safety.

Attachment 2 If you have any questions regarding our action, please contact Mark R. Bouwens of my staff at (610) 337-6910.

Thank you for your cooperation in this matter.

Sincerely,

Ronald R. Bellamy, Chief  
Decommissioning and Laboratory Branch  
Division of Nuclear Materials Safety

Docket Nos.: 030-04593  
040-02253  
070-00263  
License Nos: 20-01010-04

SUB-238  
SNM-244

Enclosures:

1. Amendment 45 for Lic. No. 20-01010-04
2. Amendment 15 for Lic. No. SUB-238
3. Amendment 30 for Lic. No. SNM-244

cc: See attached list  
cc: Letter to Kenneth Worth dated

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Reference Department  
Watertown Main Library  
123 Main Street  
Watertown, Massachusetts 02172

If you have any questions regarding our action, please contact  
Mark R. Bouwens of my staff at (610) 337-6910.

Thank you for your cooperation in this matter.

Sincerely,

Ronald R. Bellamy, Chief  
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cc: See attached list