



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

March 17, 2008

Mr. Wayne M. Reiber  
Manager, Environmental  
Assessment and Remediation  
Cabot Corporation  
Two Seaport Lane  
Suite 1300  
Boston, MA 02210

SUBJECT: INSPECTION 04009027/2007001, CABOT CORPORATION - READING SLAG  
PILE SITE, READING, PA

Dear Mr. Reiber:

From August 6, 2007 through March 6, 2008, Ms. Kauffman of this office conducted a closeout inspection and survey at the above address of activities authorized by the above listed NRC license. The inspection was an examination of your licensed activities as they relate to radiation safety and to compliance with the NRC regulations and the license conditions. The inspection consisted of observations by the inspectors, interviews with personnel, and a selected examination of representative records. The findings of the inspection, are described in the enclosed inspection report, and were discussed with you during a telephone exit meeting on March 6, 2008.

Within the scope of this inspection, no violations were identified.

In accordance with Section 2.390 of the NRC's "Rules and Practices," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR) and will be accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. No response to this letter is required. Your cooperation with us is appreciated.

Sincerely,

*/RA/*

Raymond Lorson, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

Docket No. 04009027  
License No. SMC-1562

Enclosure:  
NRC Inspection Report No. 04009027/2007001

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cc w/encl:

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D. Allard, PADEP - Bureau of Radiation Protection

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

INSPECTION REPORT

Inspection No. 04009027/2007001

Docket No. 04009027

License No. SMC-1562

Licensee: Cabot Corporation (Cabot)

Location: Reading, PA

Inspection Dates: August 6, 2007  
November 13, 2007  
January 3, 2008  
February 15, 2008  
March 6, 2008

Inspectors: Laurie Kauffman, Health Physicist, Decommissioning Branch,  
Division of Nuclear Materials Safety, Region I

Theodore Smith, Project Manager, Reactor Decommissioning  
Branch (RDB), Decommissioning and Uranium Recovery  
Licensing Directorate (DURLD), Division of Waste Management  
and Environmental Protection (DWMEP), Office of Federal and  
State Materials and Environmental Management Programs (FSME)

Thomas Youngblood, Health Physicist  
RDB, DURLD, DWMEP, FSME

Robert L. Johnson, Geologist, Special Projects  
DURLD, DWMEP, FSME

Ted Johnson, NRC Contractor, FSME

Approved By: Raymond Lorson, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety, Region I

Enclosure

## EXECUTIVE SUMMARY

Cabot Corporation (Cabot)  
NRC Inspection Report No. 04009027/2007001

The inspection report covers an announced safety inspection conducted from August 6, 2007 through March 6, 2008, by one regional radiation protection inspector, three FSME inspectors, and one NRC contractor. The inspectors reviewed on-going decommissioning activities including: radiation worker training; vegetation removal from the site and the subsequent placement of a rock erosion cover to mitigate the potential for erosion from design precipitation and flooding conditions; and the final status survey program. Within the scope of this inspection, no violations were identified.

### Closeout Inspection and Survey

- Cabot performed final status surveys of the site in accordance with the approved Decommissioning Plan (DP) and DP Completion Report. The rock type, selection, and placement of the erosion cover was designed to mitigate the potential for future erosion from design precipitation and flooding conditions. The final status survey results appeared accurate and representative of the facility conditions. Cabot met the closure objective described in the DP Completion Report, met the NRC License Termination Criteria, and demonstrated that the site was acceptable for license termination and release for unrestricted use. (Section 1.0)

## **REPORT DETAILS**

### **Summary of Facility Status**

In October 1967, Kawecki Chemical Company, Baltimore, Maryland (predecessor to Cabot), obtained Source Material License SMC-1562 from the U.S. Atomic Energy Commission. Under this license, the company was allowed to process slag containing trace amounts of natural uranium and thorium at their Reading, PA, location. The slag contained naturally occurring uranium and thorium in concentrations defined as "source material." Activities conducted at the Reading site recovered tantalum metal from the slag. The slag was placed on a pre-existing, non-radiological slag disposal area located at the southern end of the property. In 1976, the site received sand mixed with slag from cleanup of the Canton Yards in Baltimore, MD. In 1977-1978, the site received debris from the decontamination of facilities owned by one of Cabot's predecessor companies in Baltimore, MD.

Cabot currently holds NRC License No. SMC-1562 that authorizes the company to possess the slag material that was produced by the Kawecki Chemical Company. In late 1995, Cabot initiated a comprehensive site characterization at the Reading, PA site that included: a determination of slag leach rates; surface gamma measurements; radiological analysis of surface and subsurface samples; determination of the weathering rate of the slag; and, analysis of the slag pile stability. Radiological slag was identified at two topographically distinct areas - a steeply sloped embankment (slag pile area) and the River Road right-of-way (ROW). Currently, no licensed materials are used at the industrial property. Other than the slag pile and the ROW areas, all other areas where licensed material had been handled, were decontaminated and released, in August 1995, under the Site Decommissioning Management Plan.

In the late 1990's, Cabot began developing a DP for the Reading, PA, site. The NRC approved Revision 4 of the DP and amended License No. SMC-1562 on October 24, 2007, to incorporate the DP. The primary decommissioning activities included removal of vegetation from the sloped embankment and placement of a rock cover to mitigate the potential for future erosion, and conduct of a final status survey.

In February 2008, Cabot submitted their Final Closure Survey Plan. On February 15, 2008, Cabot conducted a final status survey of the Reading site and the NRC staff conducted a closeout inspection. On February 27, 2008, Cabot submitted a DP Completion Report and a request to terminate NRC License No. SMC-1562.

### **1.0 Closeout Inspection and Survey**

#### **a. Inspection Scope (Inspection Procedure 83890)**

On August 6, 2007, the inspectors conducted a site visit to observe radiation worker training that was provided to the site construction workers who were tasked to clear vegetation from and place an erosion cover on the slag disposal areas. The inspectors also visited the quarry, located in Birdsboro, PA, to validate the rock type and selection of the erosion cover.

On November 13, 2007, and January 3, 2008, the inspectors visited the Reading site to compare Cabot's rock selection and placement procedures to guidance contained in NUREG-1623, "Design of Erosion Protection for Long-Term Stabilization (Final), USNRC, September 2002," and NUREG 1757, Volume 2, "Consolidated Decommissioning Guidance, Appendix P, Example of Graded Approach for Erosion Protective Covers, September 2006."

On February 15, 2008, the inspectors conducted a performance-based closeout inspection of Cabot's final status survey program to assess whether the site decommissioning activities had been conducted in accordance with the approved DP and the Final Closure Survey Plan, Appendix 4 of the DP Completion Report. The inspectors conducted a visual inspection of the site and erosion cover. The inspectors reviewed Cabot's Final Closure Survey Plan, dated February 2008, to evaluate Cabot's method for establishing a grid pattern to perform a systematic radiation survey; to evaluate Cabot's ability to conduct adequate surveys and measurements; and, to verify the adequacy and use of survey instrumentation. The inspectors conducted an independent survey and an in-process (side-by-side) survey to evaluate and confirm the adequacy of Cabot's final status survey results and to determine whether additional confirmatory surveys would be required.

On March 6, 2008, the inspectors conducted an in-office review of the Decommissioning Plan Completion Report, dated February 27, 2008, including Appendix 5, Final Status Survey Results, to verify that the final survey results met the NRC License Termination Criteria.

b. Observations and Findings

No findings of significance were identified.

The inspectors noted that the approved DP Completion Report incorporated an engineering design feature to prevent erosion of the site from design precipitation or flooding conditions. During the August 6, 2006, site visit, the inspectors visited the local quarry and noted that the rock type and the selection of the rock for the erosion cover were appropriate. On November 13, 2007, and January 3, 2008, the inspectors visited the Reading site and verified that the rock selection and placement for the erosion cover was performed in accordance with Cabot's rock selection and placement procedures. The inspectors verified that the erosion cover was acceptable to mitigate the potential for future erosion from design precipitation and flooding conditions and was consistent with guidance in NUREG-1623 and NUREG 1757.

On February 15, 2008, the inspectors conducted a performance-based closeout inspection to evaluate Cabot's final status survey program. The inspectors conducted a visual inspection of the site and verified the erosion cover was completed on January 25, 2008 and was constructed according to the final DP Completion Report, dated February 27, 2008. The inspectors noted that Cabot personnel used an appropriate survey meter that was operable and calibrated. The inspectors observed Cabot personnel establish a grid pattern of the site and utilize a global positioning system (gps) device to locate survey points and perform a systematic radiation survey, as described in the DP and the Final Closure Survey Plan.

From a review of the DP and the Final Closure Survey Plan, the inspectors noted that Cabot designed their final status survey limits to meet the NRC License Termination Criteria of 25 millirem per year (mrem/yr) or 0.25 milliseiverts/year (mSv/yr). Cabot's closure objective was to ensure that a trespasser accessing the site for 200 hours in a year would not exceed the NRC License Termination Criteria. In order to ensure that a trespasser will not exceed this criteria, Cabot calculated that the average dose rate on the site should not exceed 0.125 mrem/hr.

The inspectors observed Cabot implement their Final Closure Survey Plan and noted that their measured dose rates across the slag pile ranged from 0.005 to 0.015 mrem/hr. Cabot determined that the dose rate results were much less than the closure objective

(0.125 mrem/hr) and therefore, the unrestricted release criteria (25 mrem/yr). Cabot documented these results in Appendix 5, Final Status Survey Results of the DP Completion Report.

The inspectors conducted an in-process (side-by-side) survey and an independent survey. During the in-process (side-by-side) survey, the NRC staff compared the dose rate results with Cabot's results from selected locations. Cabot's results were in agreement with the NRC results. During the independent survey, the NRC staff selected areas of the site that were not included in Cabot's systematic radiation survey to ensure that the entire site met the closure objective. The NRC staff measured dose rates ranging from 0.005 to 0.040 mrem/hr. The highest dose rate (0.040 mrem/hr) was identified in the ROW area (non-slag pile) of the site. This location is roughly equidistant from the three points in the DP Completion Report, Appendix 4, Final Closure Survey Plan, Figure 2 - Non Slag Pile Survey Points designated as (-128.3, -27.1); (-9.9, -27.1); and (-69.1, 75.4). The NRC staff determined from the in-process and the independent surveys that the results were much less than the annual unrestricted release criteria of 25 mrem and that additional confirmatory surveys were not required.

During the March 6, 2008, in-office review of the DP Completion Report, Appendix 5, and subsequent discussion with Cabot, the inspectors noted a typographical error in the "Closure Objective" paragraph. In this paragraph, Cabot typed 0.025 mSv instead of 0.25 mSv. This typographical error did not change the results of the final status survey and does not impact decisions regarding license termination.

c. Conclusions

Cabot performed final status surveys of the site in accordance with the approved Decommissioning Plan (DP) and DP Completion Report. The rock type, selection, and placement of the erosion cover was designed to mitigate the potential for future erosion from design precipitation and flooding conditions. The final status survey results appeared accurate and representative of the facility conditions. Cabot met the closure objective described in the DP Completion Report, met the NRC License Termination Criteria, and demonstrated that the site was acceptable for license termination and release for unrestricted use.

**2.0 Exit Meeting Summary**

On March 6, 2008, a summary of the inspection findings for the entire inspection period was presented during a telephone exit meeting with Mr. W. Reiber. The inspectors confirmed that no proprietary or safeguards information were presented in this report.

Attachment: Supplemental Information



**SUPPLEMENTAL INFORMATION**

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee and Contractors

W. Reiber, Manager, Environmental Assessment and Remediation, Cabot Corporation  
T. Knapp, Radiation Safety Officer, Cabot Corporation  
K. Fifer, Project/Construction Manager, de maximis, inc.  
P. Collopy, Certified Health Physicist, Austin-Masters Services, Inc.  
J. Bement, Health Physicist, Austin-Masters Services, Inc.

**INSPECTION PROCEDURES USED**

83890 Closeout Survey and Inspection

**ITEMS OPEN, CLOSED, AND DISCUSSED**

Opened                      None

Closed                      None

Discussed                      None

**LIST OF ACRONYMS USED**

Cabot	Cabot Corporation
DP	Decommissioning Plan
DURLD	Decommissioning and Uranium Recovery Licensing Directorate
DWMEP	Division of Waste Management and Environmental Protection
FSME	Office of Federal and State Materials and Environmental Management Programs
gps	Global Positioning System
hr	hour
mrem	millirem
mSv	millisievert
NRC	Nuclear Regulatory Commission
RDB	Reactor Decommissioning Branch
ROW	River Road right-of-way
site	Reading slag pile site