

March 23, 2006

Mr. Joe D. Jacobsen  
Battelle Memorial Institute  
Columbus Operations  
Mail Stop: JS22  
505 King Avenue  
Columbus, OH 43201-2693

SUBJECT: NRC INSPECTION REPORT 070-00008/05-004 (DNMS) - BATTELLE  
COLUMBUS LABORATORIES DECOMMISSIONING PROJECT

Dear Mr. Jacobsen:

On March 6, 2006, the NRC completed inspection activities associated with the Battelle West Jefferson North Site in West Jefferson, Ohio. The purpose of the inspection was to determine whether decommissioning activities were conducted safely and in accordance with your NRC-approved decommissioning plan and NRC requirements. The inspection included November 16 through 17, 2005, December 19 through 21, 2005, and February 16 through 17, 2006, onsite visits. The inspection activities included observation of the final shipments of transuranic wastes to an approved off-site disposal company, observation of verification surveys on the West Jefferson North Nuclear Sciences site by staff from the Oak Ridge Institute for Science and Education and the site decommissioning contractor, and confirmatory surveys and collection of soil samples by the NRC. In addition to the onsite inspections, we completed an in-office review of Battelle and NRC radiological laboratory soil sample analyses. The inspectors presented preliminary inspection findings to members of your staff at the conclusion of each onsite inspection. On March 6, 2006, the NRC inspectors conducted a final exit meeting with you by telephone to discuss the results of the onsite inspection and the NRC in-office review.

The inspection consisted of an examination of decommissioning activities at the Battelle/West Jefferson North facility as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspections are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, field observations of activities in progress, and interviews with personnel.

Based on the results of this inspection, the NRC did not identify any violations.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). The NRC's document system is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

J. Jacobsen

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We will gladly discuss any questions you have concerning this inspection.

Sincerely,

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Jamnes L. Cameron, Chief  
Decommissioning Branch

Docket No. 070-00008  
License No. SNM-00007

Enclosure:  
Inspection Report 070-00008/05-004(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.: 070-00008

License No.: SNM-00007

Report No.: 070-00008/05-004(DNMS)

Licensee: Battelle Memorial Institute  
Battelle Columbus Laboratories Decommissioning Project

Facilities: West Jefferson North Sciences Site

Location: West Jefferson, Ohio

Dates: November 16-17, 2005, (onsite)  
December 19-21, 2005, (onsite)  
February 16-17, 2006 (onsite)  
March 6, 2006 (in-office review and telephone final exit)

Inspectors: Peter J. Lee, Ph.D., CHP, Health Physicist  
George M. McCann, Senior Health Physicist

Approved By: Jamnes L. Cameron, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

## EXECUTIVE SUMMARY

### Battelle Memorial Institute Battelle Columbus Laboratories Decommissioning Project (BCLDP) Inspection Report No. 070-00008/05-004(DNMS)

This decommissioning inspection focused on the licensee's and the site decommissioning contractor's performance related to decommissioning support activities, final status surveys by the licensee and staff from the Oak Ridge Institute for Science and Education and confirmatory surveys by the NRC. The licensee initiated demolition, remediation, and decommissioning activities at the West Jefferson Nuclear Sciences site beginning in 1999. As of February 17, 2006, all of the buildings, filter beds and underlying soils, identified in the licensee's decommissioning plan as impacted, have been remediated to unrestricted release levels. Additionally, the inspectors observed the final shipment of the last remaining quantities of remote handled transuranic waste to the U.S. Department of Energy's Savannah River facility.

During this inspection, a new site issue was discovered, which could potentially extend the licensee's decommissioning of the site. Specifically, the licensee performed in depth core drilling to investigate the identification of soil contamination (americium-241, plutonium-238, plutonium-239, plutonium-241 (transuranic (TRU)), which may have originated from previous decommissioned activities, the radiological mixture of which was not consistent with the current site characterization profile.

#### Closeout Inspection and Survey

- The inspectors concluded that the licensee's draft final status reports were technically adequate. The inspectors also concluded that the NRC's confirmatory surveys were consistent with the licensee's survey findings, and that both the licensee's report and NRC's surveys demonstrated that the radiological conditions of the areas surveyed were consistent with the radiological criteria for unrestricted use as specified in the licensee's decommissioning plan. (Section 1.0)
- The inspectors also concluded that the licensee's performance to investigate and characterize the americium and plutonium soil contamination was appropriate and timely. (Section 1.0)

#### Transportation Activities

- The inspectors determined that the licensee complied with NRC and Department of Transportation regulations for shipments of radioactive waste. (Section 2.0)

## Report Details<sup>1</sup>

### 1.0 **Closeout Inspection and Survey (83890)**

#### 1.1 Inspection Scope

The inspectors interviewed and observed the licensee's decommissioning contractor and the Oak Ridge Institute for Science and Education personnel during the conduct of final status surveys. The inspectors reviewed the licensee's raw final status survey data and the following draft reports: "Columbus Closure Project, Characterization and Final Status Survey Report, for the JN-1A and C Foundation Excavation, Revision 0, December 2005," the "Columbus Closure Project, Final Status Survey Report, For Remaining Land Areas Inside the WJN Site Fence line, Revision 0, February 2006," and "Columbus Closure Project, Characterization and Final Status Survey Report for the JN1-4 Bog Area and SS-JN1-2 Outfall, Revision 0, November 2005." The inspectors also performed independent and confirmatory radiological surveys in the JN-1A/C building excavation areas, JN-4 trench area due to the excavation of abandoned sanitary pipes, JN1-4 Bog Area and SS-JN1-2 Outfall, and the Active Middle Filter Bed Area. The inspectors collected soil samples from the JN-1A/C, and JN-4 excavations. The inspectors used calibrated 2 inch by 2-inch sodium iodide scintillation detectors for surface soil scanning during the performance of walk-over surveys.

The inspectors observed and evaluated the licensee's activities to investigate soil contamination (americium-241, plutonium-238, plutonium-239, plutonium-240, and plutonium-241) suspected to be from activities previously conducted at the JN-4 building. The inspectors discussed the survey findings with the licensee's staff, and reviewed and evaluated draft survey data transmitted to the NRC during a telephone conference on March 6, 2006.

#### 1.2 Observations and Findings

The licensee performed site characterization activities, and used this data to develop a radioisotope profile. The purpose of the profile was to identify those radiological materials with the greatest probability of being present in the underlying soils due to past operations. The isotopes included: cobalt-60, strontium-90, cesium-137, americium-241, plutonium-238, uranium-234, uranium-235, uranium-238, and total uranium. The licensee used cesium-137 as a surrogate for the other radioisotopes present in the soil. The surrogate value was based on approved unrestricted release criteria specified in the licensee's decommissioning plan for residual radioactivity concentrations in soil. The licensee had determined that the maximum allowable concentration for the cesium-137 in soil could not exceed 11 picocuries per gram in order to meet the unity rule for the other radioisotopes.

The inspectors' radiological walk-over surveys of the site soils for buildings JN-1A and JN-C, and the above ground site soils, after back-filling of building excavations, and locations where remediated soils had been stored prior to off-site disposal, did not identify anything to be distinguishable from the site's ambient radiological background (approximately 7 to 11 microrems per hour). Additionally, eight NRC soil samples were

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<sup>1</sup>A list of acronyms used in the report is included at the end of the Report Details.

collected, seven from JN-1 (Grids 97-NE, 84-SW, 98-SW, 70-NW, 99-SE, 85-NW, 70-SE), and one from JN-C (Grid 114). The NRC used its contract laboratory service, the Oak Ridge Institute for Science and Education, to analyze soil samples collected by the NRC. The highest concentration of cesium-137 identified in the four soil samples collected by the NRC was 3.24 picocuries per gram. The inspectors review of the licensee's draft final status survey reports did not identify any radiological contaminants above the licensee's unrestricted release limits.

During the conduct of final status surveys by the licensee of a 600-foot long trench where the JN-3 building cooling tower sanitary discharge line had lain, the licensee identified transuranic contamination in four samples collected from soil beneath the discharge line. The section of the trench where the TRU contamination was identified was about 30 feet long and approximately 50 feet south of the JN-4 building. The licensee determined that the activity ratios of the cesium-137 to the transuranic materials identified in the four samples did not represent the current site radiological characterization profile. The licensee speculated that the contamination is from activities previously performed at the JN-4 building, and not from the other West Jefferson site buildings currently under remediation by the licensee.

The JN-4 building was used by Battelle under contract to the U.S. Department of Energy as a radioactive materials research facility beginning in 1960 and concluding in 1978. The JN-4 building was decontaminated by Battelle and surveyed by the U.S. Department of Energy and released for unrestricted use in 1983. The Argonne National Laboratories, under contract to the U.S. Department of Energy performed radiological surveys on the JN-4 building and the adjoining areas during 1980, 1981, and 1982. The NRC informed Battelle in a letter dated April 29, 1983, since the activities conducted in the JN-4 building were exempt from NRC licensing requirements, that the U.S. Department of Energy survey findings would be accepted by the NRC as demonstration that the building was acceptable for unrestricted release. Thus, the JN-4 building was not considered as an impacted area in Battelle's current NRC-approved decommissioning plan. However, Battelle committed to conduct final status surveys on the subsurface soils adjoining the JN-4 building as part of a complete site release in its decommissioning plan. Therefore, the licensee expanded its evaluation of the JN-4 land area after the americium and plutonium were identified in final status soil samples.

The inspectors collected six soil samples from the JN-4 trench area: grid 9 (three separate samples), and one sample each from grids 4, 11-070, and 16). The highest concentration of cesium-137 identified in the six soil samples collected by the NRC was 0.06 picocuries per gram. The inspectors also requested Oak Ridge Institute for Science and Education to analyze the six soil samples for americium-241. The highest concentration of americium-241 identified in the six soil samples was 1.24 picocuries per gram. The approved unrestricted release criteria specified in the licensee's decommissioning plan for residual americium-241 in soil is 30 picocuries per gram. The Oak Ridge Institute for Science and Education analysis report is publicly available through NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML060380274.

The licensee decided to collect more samples to better characterize the area of contamination. Therefore, the licensee will perform a Phase II core boring survey. The licensee indicated that the results of these samples should be available by the middle of

March 2006, and that the results of the investigation and the additional sampling data will be submitted to the NRC by the end of March 2006.

### 1.3 Conclusions

The inspectors concluded that the licensee's draft final status reports were technically adequate. The inspectors also concluded that the NRC's confirmatory surveys were consistent with the licensee's survey findings, and that both the licensee's report and NRC's surveys demonstrate that the radiological conditions of the areas surveyed are consistent with the radiological criteria for unrestricted use as specified in the licensee's decommissioning plan. The inspectors also concluded that the licensee's performance to investigate and characterize the americium and plutonium soil contamination was appropriate and timely.

## 2.0 **Transportation Activities (86740)**

### a. Inspection Scope

The inspectors observed and evaluated the licensee's and a transportation service contractor's activities prior to the shipment of transuranic waste off-site to an approved recipient. Licensee and contractor personnel involved with the preparation and shipment of transuranic waste were interviewed. The inspectors performed independent radiological surveys on the shipping containers prior to shipment. The inspectors reviewed the licensee's procedure TR-OP-003, Revision 4, "Transportation Operating Procedure."

### b. Observations and Findings

The licensee completed the final shipments of transuranic wastes to the U.S. Department of Energy's Savannah River facility. The licensee's personnel packaged, labeled, and marked each shipping container according to the U.S. Department of Transportation and 10 CFR Part 71 transportation requirements. The licensee verified that the results of radiation and removable contamination levels were within applicable limits. The waste manifests included all required information.

### c. Conclusions

The inspectors determined that the licensee had complied with NRC and Department of Transportation regulations for shipments of radioactive waste.

## 3.0 **Exit Meeting**

The inspectors presented their preliminary inspection findings to the licensee's Radiation Safety Officer following the onsite inspection. On March 6, 2006, the inspectors discussed the final inspection findings with Battelle management during a telephone conference call. The licensee acknowledged the findings presented. The licensee did not identify any documents or processes reviewed by the inspectors as proprietary.

## **PARTIAL LIST OF PERSONS CONTACTED**

J. Jacobsen, BCLDP West Jefferson Radiation Safety Officer, Battelle  
J. Halgren, Health Physicist, Battelle  
S. Zoller, Radiation Safety Officer, Closure Services  
K. Wiegel, Characterization Supervisor, Closure Services  
G. Henderson, Project Manager, Closure Services  
J. Sattler, U.S. Department of Energy  
J. Griffin, U.S. Department of Energy

## **INSPECTION PROCEDURES USED**

IP 83890      Closeout Inspection and Survey  
IP 86740      Transportation Activities

## **ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened                      None  
Closed                      None  
Discussed                      None

## **LIST OF ACRONYMS USED**

ADAMS                      Agencywide Documents Access and Management System  
CFR                          Code of Federal Regulations  
DNMS                        Division of Nuclear Materials Safety  
NRC                          Nuclear Regulatory Commission  
PARS                        Publicly Available Records  
TRU                          Transuranic radiological materials