September 29, 2005

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

SUBJECT: NRC INSPECTION REPORT 070-00008/05-002(DNMS) - BATTELLE COLUMBUS LABORATORIES DECOMMISSIONING PROJECT

Dear Mr. Jacobsen:

On September 9, 2005, 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 a June 28 through 29, 2005 onsite visit. Specifically, the inspection activities included NRC confirmatory surveys, observation of verification surveys on the West Jefferson North Nuclear Sciences site's filter bed area, and collection of water samples from groundwater monitoring wells (non-potable water wells). In addition to the onsite inspection on September 9, 2005, we completed an in-office review of Battelle and NRC radiological laboratory groundwater analyses. The inspectors presented preliminary inspection findings to members of your staff at the conclusion of the onsite inspection. On September 9, 2005, 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 inspections 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 for public inspection 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.

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

Sincerely,

/RA/

Jamnes L. Cameron, Chief
Decommissioning Branch

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

Enclosure: Inspection Report 070-00008/05-002(DNMS)

cc w/encl: P. Weaver, Director, Battelle Columbus Laboratories Decommissioning Project
J. Satler, Department of Energy
R. Owen, Ohio Department of Health
R. Vandegrift, Ohio Department of Health

Distribution w/encl:
G. E. Grant, RIII
S. A. Reynolds, RIII
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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.:	070-00008
License No.:	SNM-00007
Report No.:	070-00008/05-002(DNMS)
Licensee:	Battelle Memorial Institute Battelle Columbus Laboratories Decommissioning Project
Facilities:	West Jefferson North Sciences Site
Location:	West Jefferson, Ohio
Dates:	June 28 through 29, 2005 (onsite), and September 9, 2005 (in-office review)
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. 070-00008/05-002(DNMS)

This decommissioning inspection focused on the licensee's and the site decommissioning contractor's performance related to decommissioning support activities, final status and confirmatory surveys, and determination of any environmental radiological impacts on the site groundwater.

The licensee initiated demolition, remediation, and decommissioning activities at the West Jefferson Nuclear Sciences site beginning in 1999. As of June 29, 2005, all of the buildings and their underlying soils, except for the licensee's Building JN-1 soils and parts of the on-site filter beds, have been demolished, and their associated foundations and subsurface soils have been remediated to unrestricted release levels. The licensee's decommissioning schedule calls for the completion of decommissioning activities associated with the JN-1 foundation and underlying soils, and the filter beds by the end of October 2005. Once these activities have been completed, the licensee will conduct additional verification surveys to identify any remaining impacted areas, and once satisfied that there are no remaining areas in excess of the NRC-approved unrestricted release limits, the licensee will conduct a final status survey. The licensee's decommissioning plan schedule calls for the completion of its final status survey by the end of November 2005.

Closeout Inspection and Survey

- The inspectors concluded that the licensee's final status report documenting the licensee's surveys of the filter bed area associated with the former Well Injection and Deep Extraction (WIDE) System was technically adequate, and that it demonstrated that the radiological conditions were consistent with the radiological criteria for unrestricted use, as specified in the licensee's decommissioning plan. (Section 1.0)

- The inspectors concluded that their confirmatory surveys were consistent with the licensee's survey findings, and that the residual radioactive contaminants in the site filter beds associated with the former WIDE System were remediated to levels consistent with the licensee's radiological criteria for unrestricted use, as specified in the licensee's decommissioning plan. (Section 1.0)

- The inspectors also concluded that the licensee's program for monitoring of the North Nuclear Sciences site's groundwater demonstrated that residual radiological materials in the site groundwater were consistent with 10 CFR Part 20, Subpart E limits for unrestricted use.

Report Details[1]

1.0 Closeout Inspection and Survey (83890)

1.1 Inspection Scope

The inspectors reviewed and evaluated the licensee's final survey report for the former filter bed's "Well Injection Deep Extraction (WIDE) System." The inspectors also performed independent and confirmatory radiological surveys, including the collection of four soil samples. The inspectors also interviewed and observed licensee staff during remediation and survey activities. The inspectors' surveys included walkover surface scans of the WIDE System filter bed area using a Ludlum survey meter, model 2241-1, with a Ludlum model 44-10, two inch by two inch sodium iodide scintillation detector. This survey meter was calibrated on March 18, 2005.

The inspectors reviewed and evaluated the licensee's isotopic and gross alpha and beta analytical data reported for groundwater monitoring wells (non-potable water) located at Battelle's West Jefferson North Nuclear Sciences site for the periods covering the years 2000 through 2004 and the first half of 2005. The licensee's sampling data was for groundwater monitoring wells: 100, 101, 103, 110R, 116R, 118, 150, 155, 168, 172, 206, 300, 306, 506, 601, C03, C09, and C16. The focus of the NRC sample collection and analyses was to determine if radiological materials from past nuclear research activities have been released into the groundwater from three buildings located on the site. The buildings assessed were JN-1, JN-2, and JN-3, and their associated underground pathways, such as sanitary sewer lines and former filter beds.

The inspectors collected 11 water samples from 9 of the licensee's groundwater monitoring wells as follows: 100, 118, 168, 206, 306, 506, 601, C09, and C16. The inspectors also collected one surface water sample from Big Darby Creek, which is located along the West border of the West Jefferson North site.

1.2 Observations and Findings

The results of the licensee's final status surveys for the WIDE System located in the filter bed area did not indicate any radiological contaminants above the licensee's unrestricted release limits, as described in its decommissioning plan.

The inspectors did not measure any radiation levels above the ambient radiological background in the site soils surveyed, except in two locations identified in the licensee's final status survey reference grid, as Grids 27 and 30. Four soil samples: two from Grid 27SW, and two from Grid 30 NW were collected. The licensee had 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

[1]A list of acronyms used in the report is included at the end of the Report Details.

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 NRC used its contract laboratory service, the Oak Ridge Institute for Sciences and Education (ORISE) to analyze the NRC soil samples. The highest concentration of cesium-137 identified in the four soil samples collected by the NRC was 3.05 picocuries per gram. The ORISE analysis report is publicly available through NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML052380371.

The licensee had installed 18 groundwater monitoring (non-potable water) wells near the former research buildings and their associated filter beds. The licensee's environmental monitoring program required the semi-annual collection and analysis of water samples.

The licensee's groundwater isotopic analyses for years 2002 through 2004, and the first half of 2005 for the monitoring wells did not identify any radiological contaminants above the NRC's 10 CFR Part 20, "Standards for Protection Against Radiation," Appendix B, "Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides . . . ," effluent limits. The licensee's analytical reports reviewed by the NRC inspectors are publicly available through NRC's Agencywide Documents Access and Management System (ADAMS), Accession Nos. ML052500264, ML052500283, ML052500299, ML052500313, ML052500321, ML052500478, ML052500490, ML052500532.

After review of the licensee's and ORISE's isotopic data for the years 2000 through 2005, the NRC inspectors noted that the reported americium-241, plutonium-238 and 239 (transuranium elements) were below the Maximum Detectable Concentration (MDC) for these isotopes. The alpha spectroscopy MDCs for these isotopes were about 1 picocurie per liter, which is significantly below the Environmental Protection Agency's 15 picocuries per liter drinking water limit for gross alpha activities. The concentrations for the other byproduct materials of interest were also below or about MDC values, except for uranium and strontium-90, which were slightly above their MDCs. The total natural uranium concentration ranged up to 10 picocuries per liter, and the strontium-90 concentrations ranged up to a maximum of 45 picocuries per liter. The ORISE analysis report regarding the 12 NRC water samples is publicly available through NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML052380371.

After review of the licensee's gross alpha and beta groundwater monitoring wells' analytical data for the years 2000 through 2005, the NRC inspectors identified instances where the values were slightly greater than the Environmental Protection Agency's (EPA) public drinking water radiological limits of 15 picocuries per liter gross alpha, and 50 picocuries per liter beta. However, after review of the isotopic data, the NRC inspectors found that the sources for the elevated gross alpha and beta concentrations were most likely due to the presence of strontium-90, and to naturally occurring uranium and radium-226 in the groundwater. The licensee indicated and the inspectors verified with the State of Ohio Environmental Protection Agency, that none of the licensee's monitoring wells are used, or are qualified for licensing by the State Environmental Protection Agency for drinking water purposes.

The inspectors reviewed the licensee's analytical data for the last five years and identified a few groundwater monitoring wells with strontium-90 results above MDC values. The inspectors evaluated the highest reported strontium-90 value, which was 45 picocuries per liter for dose consequence. This value was reported to the NRC by ORISE in its August 9, 2005 report. The inspectors used the International Commission for Radiation Protection (ICRP) Report No. 26, "Recommendations of the International Commission on Radiological Protection," and Report No. 30, "Limits for Intakes of Radionuclides by Workers," methodology to evaluate the strontium-90 concentration identified in the groundwater sample. The limits for liquid and gaseous effluents in Appendix B to 10 CFR Part 20, are based on the dosimetry models established in these ICRP Reports. The inspectors evaluation resulted in a derived radiation dose of approximately 4.5 mrem per year to a potentially exposed individual. This dose is well below the NRC's limit for individual members of the public from licensed operations, of 100 mrem per year, and below the NRC's limit for unrestricted release, of 25 mrem per year. All of the other elevated strontium-90 values, noted in the licensee's analytical data, were less than 30 picocuries per liter, with the majority of the sampling results for strontium-90 being at or near the licensee's MDC of 1-3 picocuries per liter. The licensee provided a summary regarding their review of the strontium-90 data for the time period of 2002 thru the first half of 2005 for the West Jefferson Site groundwater monitoring wells. The licensee indicated that the water sample results were less than or equal to the equipment MDC approximately 67 percent of the time, and that the water sample results were less than eight picocuries per liter (EPA Drinking Water Limit for strontium-90) approximately 85 percent of the time.

1.3 Conclusions

The inspectors concluded that the licensee's final status report documenting the licensee's surveys of the filter bed area associated with the former Well Injection and Deep Extraction (WIDE) System was 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 condition of the WIDE System is consistent with the radiological criteria for unrestricted use as specified in the licensee's decommissioning plan. The inspectors concluded that the licensee's program for monitoring of the North Nuclear Sciences site's groundwater demonstrated that residual radiological materials in the site groundwater were less than the 10 CFR Part 20, Subpart E limits for unrestricted use.

2.0 Exit Meeting

The inspectors presented their preliminary inspection findings to the licensee's Radiation Safety Officer following the onsite inspection. On September 9, 2005, the inspectors discussed the final inspection findings with Battelle's Radiation Safety Officer. 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
R. Falter, Environmental Manager, Closure Services
P. Adams, Environmental Technician, Closure Services
S. Hampton-Environmental Specialist, Ohio EPA Central District Office

INSPECTION PROCEDURES USED

IP 83890	Closeout Inspection and Survey
IP 88045	Environmental Monitoring

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	None
Closed	None
Discussed	None

PARTIAL LIST OF DOCUMENTS REVIEWED

1. August 9, 2005 Oak Ridge Institute for Science and Education, “Analytical Results for Four Soil Samples and 12 Water Samples from the Battelle West Jefferson Site [TAC No. 070-00008/2005-002] (RFTA No. 05-001)” (ML052380371)

2. August 26, 2005 e-mail from Joe Jacobsen, Radiation Safety Officer, Battelle, Subject: “Monitoring well data from Battelle's West Jefferson Site 8/26/05," with 7 attachments: (ML052500264)

   A. “Summary of Radiological Groundwater Monitoring Wells, West Jefferson Site CY 2002;” (Gamma/Alpha Analysis) (ML052500283))

   B. “Summary of Radiological Groundwater Monitoring Wells, West Jefferson Site CY 2003;” (Gamma/Alpha Analysis) (ML052500299))

   C. “Summary of Radiological Groundwater Monitoring Wells, West Jefferson Site CY 2004;” (Gamma/Alpha Analysis) (ML052500313)

   D. “Summary of Radiological Groundwater Monitoring Wells, West Jefferson Site CY 2005;” (Gamma/Alpha Analysis) (ML052500321)

   E. “West Jefferson Site, Groundwater Monitoring Wells, 2002;” (Alpha/Beta Analysis) (ML052500478)

   F. “West Jefferson Site, Groundwater Monitoring Wells, 2003,” (Alpha/Beta Analysis) (ML052500490)

G. “West Jefferson Site, Groundwater Monitoring Wells, 2002,” (Alpha/Beta Analysis) (ML052500532)

3. September 7, 2005 e-mail from Joe Jacobsen, Radiation Safety Officer, Battelle, Subject: “Final Monitoring Well Data Submittal from Battelle West Jefferson Site" with 3 attachments: (ML052500264)

   A. “Summary of Gamma Spectroscopy Analyses for NRC Split Run on the West Jefferson Site RAL-June 2005"

   B. “West Jefferson Site, Groundwater Monitoring Wells, 2005" (Alpha/Beta analyses, June 2005)

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Materials Safety
dpm	Disintegrations per minute
EPA	Environmental Protection Agency
ICRP	International Commission on Radiation Protection
MDC	Minimal Detectable Concentration
NRC	Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
PARS	Publicly Available Records