

December 22, 2000

Mr. Craig Jensen
Radiation Safety Officer
Battelle Memorial Institute
Columbus Operations
505 King Avenue
Columbus, OH 43201-2693

SUBJECT: NRC INSPECTION REPORT 070-00008/2000003(DNMS)

Dear Mr. Jensen:

On December 6, 2000, the NRC completed an inspection of decommissioning activities at Battelle Columbus Laboratories' West Jefferson Site, located at West Jefferson, Ohio. Areas examined during this inspection included Personnel Radiological Dose Management, day-to-day radiological work safety practices, and Battelle's emergency performance in dealing with a workplace accident. The enclosed report presents the results of the inspection.

In general, decommissioning activities in the areas inspected were performed satisfactorily. Management was monitoring, assessing, and controlling radiation dose and the radiological aspects of decommissioning. No violations of NRC requirements were identified during this inspection.

During the inspection, Battelle was observed responding to an actual industrial workplace accident which involved personal injury to a Decontamination and Decommissioning (D&D) Worker. Battelle's entire staff demonstrated a high degree of professionalism and training in dealing with this incident, showing the licensee's commitment to and practice in emergency response.

Two issues from this inspection will be of future interest to NRC. One is a review of the report of the injury event; we request that the NRC be provided with the evaluation report regarding the cause of the event when the report is completed. The other issue of interest is licensee planning for activities involving excavation at the site; we request that NRC be informed in advance of future activities involving potential underground contamination, so that we can determine whether inspection effort is appropriate.

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C. Jensen

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

Sincerely,

/RA/

Bruce L. Jorgensen, Chief
Decommissioning Branch

Docket No. 070-00008

License No. SNM-7

Enclosure: Inspection Report 070-00008/2000003(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 070-00008/2000-003(DNMS)

Licensee: Battelle Memorial Institute - Columbus Division

Location: West Jefferson, Ohio

Dates: December 5-6, 2000

Inspector: George M. McCann, M.S., Senior Radiation Specialist

Accompanied By: Joe Crombie, M.S., CHP, Health Physicist, Ohio
Department of Public Health

Eric Denison, M.S., Health Physicist, Ohio Department of
Public Health

Approved By: Bruce L. Jorgensen, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

BATTELLE COLUMBUS LABORATORIES DECOMMISSIONING PROJECT NRC Inspection Report 070-00008/2000003(DNMS)

This routine decommissioning inspection evaluated the licensee's ongoing decommissioning activities at its West Jefferson Site. Inspection activities specifically focused on aspects of the licensee's management and control of its radiological dose monitoring program, and day-to-day radiological safety practices. Overall, major decommissioning activities were adequately monitored and controlled. No violations of NRC requirements were identified. One open Inspection Item (NRC Inspection Report No. 070-00007/2000002 (DNMS)) was closed, regarding the potential impact of the failure of the hydraulic system for the High Level Cell and Low Level Cell Hydraulic Doors in JN-1.

Radiological Dose Management Program

- The licensee's ALARA and Dose Equalization Program appeared to be properly emphasized, to the extent that no Battelle employee exceeded 20 percent of the NRC annual Regulatory dose limits.

Radiological Safety Practices

- Posting and security requirements were being met in the areas inspected.
- Personnel Protective Equipment (PPE), personnel frisking surveys, and Contaminated Area (CA) exit procedures were being properly utilized.
- Calibration and use of radiation survey meters, personal ionization chambers (PIC), and air sampling equipment were in compliance with established requirements.

Emergency Response Activities

- The licensee's management and staff responded to a potentially serious incident which involved personal injury to a Decontamination and Decommissioning (D&D) worker, who was performing activities in the Alpha/Gamma Cells, a highly contaminated area. The response was professionally accomplished and demonstrated an excellent degree of training.

Closure of Open Item

- The inspector determined that appropriate engineering and procedural steps had been taken to address a potential safety issue involving the hydraulic system to the Hot Cell Doors, which could potentially fail open allowing unshielded access to the hot cells.

Report Details

Summary of BCLDP Activities

The inspector observed the licensee's activities as follows:

- Characterization, volume reduction, and packaging of Transuranic (TRU) waste activities in the High Energy Cell (HEC) and the Low Level Cell (LLC) and other associated support areas of the first floor level of the JN-1 Building. The licensee continues to operate an "in-house laundry" for cleaning contaminated mop-heads and rags. Indications were that this system was working efficiently. The laundry was not being used during the inspection. The amount of contaminated materials inside the Cells appeared to have been significantly reduced since the last inspection. Additionally, the inspector observed operators videotaping waste segregation activities in the Hot Cells. These tapes are to be used for validation purposes for the waste vendors. The licensee had also established a secondary storage site (Duframe Cask) in the High Bay Area for storage of TRU waste. The licensee indicated that the floor loading for this storage unit had been evaluated.
- Decontamination activities conducted in the Alpha-Gamma Cells located in the basement of the JN-1 Building. The removal, size reduction, and disposal of liners, support platforms, and other materials from these Cells was completed. The shielded doors for cells 3 through 10 had been removed, covered, and packaged for disposal. During this inspection an industrial accident occurred during work activities related to the removal of Alpha-Gamma Cell Door 2. This is discussed in greater detail in Section 2.2 below.
- Decontamination activities related to the decommissioned research reactor located in JN-3. Current activities include the diamond wire saw cutting of the reactor pool bio-shield into 8-10 ton blocks, wrapping, and packaging of these blocks for shipment for disposal. Significant progress had been accomplished in the removal of the shield. The licensee projected that the reactor bio-shield will be completely removed by January 2001. The inspector surveyed two blocks which were on the basement floor of the facility; measurements did not reveal any significant levels of radiation. The licensee indicated that a professional engineering evaluation had been performed, to address floor and balcony weight loading. The licensee was also performing subsurface characterization of materials below the former research reactor facility.
- Observed characterization activities being conducted in outdoor areas at the West Jefferson North Grounds. The licensee's characterization group was actively collecting soil samples for radiological characterization of the outdoor areas. The inspector also determined that excavation and removal of a 320 foot long abandoned filter bed discharge pipe leading to the Big Darby Creek had been completed. The excavation had been backfilled, graded, and seeded. The excavated pipe had been contained in plastic bags and stored in the JN-3 Annex to await volume reduction and packaging for disposal. The licensee is currently working on characterizing an old filter bed, and may initiate remediation of the filter bed in the near future. Appropriate licensee management was requested during a telephone conversation on December 19, 2000, that, in the future, considering the potential significance of excavation and reburial operations on ultimate site release, the NRC would like to be notified prior to similar operations, to determine whether to observe these operations.

1.0 RADIATION PROTECTION (83822)

1.1 General

The inspector assessed facility management and control of its radiation protection program, by review of records and procedures, observation of decommissioning safety activities, interviewing managers, supervisors and staff, and attending licensee meetings related to these activities. Specific events and findings are detailed in the sections below.

1.2 Radiation Dose Tracking

a. Inspection Scope

The inspector interviewed the Acting Dosimetry Project Manager, ALARA Coordinator, and Radiological Technical Support Manager. These individuals have the primary responsibility for tracking, recording, and reporting dose to BCLDP managers, supervisors, and staff. The inspector also reviewed the licensee vendor's TLD reports for 1st, 2nd and 3rd quarters of calendar year 2000, ALARA Quarterly and Annual Reports, and other reports related to dose tracking. The inspector evaluated the licensee's statements and information obtained from the review of dose monitoring documents against NRC Part 20 dose regulatory limits, and license conditions.

b. Observations and Findings

The inspector reviewed the following reports: April 28, 1999, Memorandum from Glenn Henderson, "ALARA- Calendar Year 1999 ALARA Goals"; December 13, 1999, Memorandum from G. Henderson, to N. Joseph Gantos, Manager, Decommissioning and Decommissioning Operations, "ALARA Goals for Calendar Year 2000"; February 11, 2000, Memorandum from ALARA Coordinator to RTS Manager, "ALARA BCLDP Annual Report 1999"; July 27, 2000, Summary and/or Special Report Form, "ALARA Surveillance", September 22, 2000, Summary and/or Special Report Form, "ALARA Surveillance", September 26, 2000, Summary and/or Special Report Form, "ALARA Surveillance"; November 15, 2000, Memorandum from ALARA Coordinator to Dosimetry Project Manager/FROM, "ALARA-TLD versus PIC Report 3rd Quarter 2000"; November 6, 2000 Memorandum from ALARA Coordinator to RTS Manager, "ALARA-Monthly Exposure Report for October 2000"; November 15, 2000, Memorandum from ALARA Coordinator to RTS Manager, "ALARA BCLDP Quarterly Status Report 3rd Quarter, 2000"; and TLD vendor reports for CY 2000. The inspector also reviewed 26 Dosimetry Investigation Reports (DIR) generated during CY 2000, and PIC Calibration Reports. The licensee's staff discussed with the inspector their program to maintain radiation worker's doses below NRC regulatory limits, and the licensee's Administrative Dose Limits, which is described in the licensee's *Radiation Protection Program* (currently tied down in the licensee's license as a commitment). The inspector also discussed the licensee's program to maintained the annual ALARA Goals, which included a Dose Equalization commitment.

Based on the discussions, and review of records it was determined that BCLDP radiation worker DDE doses were below the licensee's 1,000 mrem ALARA Annual Limit, which is 20% of the NRC Regulatory Annual Limit, and 50% of the licensee's Administrative Annual Dose Limit of 2,000 mrem. It was also determined that none of

the BCLDP workers exceeded the licensee's quarterly Administrative DDE Limit of 500 mrem, which is 40% of the NRC quarterly limit.. The licensee also is committed to a program of Dose Equalization. This initiative was started for the first time in 1999. The licensee implements this initiative as part of their ALARA Program, and as such establishes Goals annually. The inspector determined that this initiative was being managed in such a manner to meet the intent of this initiative. Review of the ALARA Surveillance Reports demonstrated that the licensee is monitoring this initiative and taking steps to correct and improve its program.

c. Conclusions

No concerns were identified in this area.

1.3 **Reviews, Audits, and Assessments** (88005)

a. Inspection Scope

The inspector examined the licensee's activities for performing internal reviews, including corrective actions and root cause evaluations.

b. Observations and Findings

The inspector interviewed the Radiological Technical Support Manager, and the Radiological Awareness Report Coordinator regarding the implementation of the "Radiological Awareness Reports (RAR) program. The inspector reviewed RAR Reports No. 00-011, and 00-012 which had been issued since the last NRC inspection. Report No. 00-011 discussed an unauthorized entry into the JN-3 reactor pool while rubblization operations were being performed. RAR No. 00-012 addressed the chipping of contaminated material from a concrete block removed from the reactor bioshield. Review of the RAR conditions, the licensee's management response and follow up to close-out these issues appeared prompt and appropriate.

c. Conclusions

No concerns were identified in this area.

1.4 **General Health Physics Practices** (83822)

a. Inspection Scope

To determine the licensee's compliance with general radiation safety practices, the inspector toured licensee's workplaces and observed decontamination and decommissioning activities. The inspector also observed radiological posting and security measures implemented by the licensee.

b. Observations and Findings

The inspector checked numerous radiation safety meters used for performing general area surveys, personnel frisking stations, portal monitors for functional ability and for proper calibration. The inspector cross compared three licensee meters against the NRC survey meter, and found good agreement. The inspector also checked a number

of air samplers for proper calibration. The inspector also observed personnel performing personal radiological frisking surveys prior to exiting controlled areas. Inspector radiation survey measurements made in licensee work areas were in accordance with the licensee's measurements and area postings. Additionally, appropriate signs and barriers were being employed in areas observed.

c. Conclusions

No concerns were identified in this area.

2.0 EMERGENCY PREPAREDNESS (88055)

2.1 General

The inspector assessed the licensee's capabilities in dealing with accidents which occur in decontamination and decommissioning workplaces where radiological activities are being conducted.

2.2 Emergency Response Activities

a. Inspection Scope

The inspector reviewed the licensee's response relating to a September 2000, Emergency Response Drill. Additionally, the inspector observed the licensee's response to an actual workplace accident which occurred in the lower basement of JN-1 Alpha-Gamma Cell Area on December 5, 2000.

b. Observations and Findings

The inspector reviewed the licensee's December 18, 2000, memorandum from the Battelle Emergency Coordinator to the BCLDP Program Manager "Emergency Response to the JN-1 Alpha/Gamma Cell Incident." A description of the incident is excerpted in part as follows: "This report is limited to an evaluation of emergency response actions that occurred on the afternoon of December 5, 2000 when a hot cell door weighing approximately 24,000 pounds unexpectedly fell forward to the floor injuring one employee and barely missing another. It is written from the viewpoint of the BCLDP Emergency Management Coordinator in the spirit of an after action report that follows drills and exercises. It includes lessons learned and recommendations." The inspector's review of the incident report and direct observation of the licensee's response activities during the incident and previous emergency exercise determined that the licensee's staff is well trained in emergency response procedures and responded to the incident in a professional and efficient manner.

The licensee established an Alpha-Gamma Cell Accident Investigation team the day after the incident to evaluate the root cause. To insure objectivity and that an independent assessment, Battelle formed the accident investigation team from individuals not working in the BCLDP Project. The team consisted of three individuals: an accident and safety consultant, a DOE representative with an engineering and safety background, and a Battelle accident and safety professional. The licensee indicated that the accident report should be available in January 2001. A copy of this report was requested by NRC for future possible follow up review.

c. Conclusions

No concerns were identified in this area.

4.0 Exit Meeting

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on December 6, 2000. The licensee acknowledged the findings presented. The licensee did not identify any documents or processes reviewed by the inspector as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

N. Gantos, BCLDP, Program manager
C. Jensen, BCLDP, RSO
A. Chance, BCLDP, Manager, Radiological Technical Support and ARSO
J. Halgren, BCLDP, Radiological Field Operations Manager
L. Sander, BCLDP, HP, ALARA Coordinator
J. Gauthier, BCLDP, Acting Dosimetry Manager
P. Weaver, BCLDP, Field Operation Manager

INSPECTION PROCEDURES USED

IP87104	DECOMMISSIONING INSPECTION PROCEDURE FOR MATERIALS LICENSEES
IP88005	MANAGEMENT ORGANIZATION AND CONTROLS1
IP83822	RADIATION PROTECTION
IP88055	EMERGENCY PREPAREDNESS

LIST OF ACRONYMS USED

ALARA	As-Low-As-Reasonably-Achievable
AAR	Activity Assessment Report
ATSS	ALARA Support Staff
BCLDP	Battelle Columbus Decommissioning Project
DDE	Deep Dose Equivalent
DDO	Decontamination & Decommissioning Operations
DIR	Dosimetry Investigation Report
CAA	Controlled Access Area
CFR	Code of Federal Regulations
CY	Calendar Year
DOT	Department of Transportation
HP	Health Physicist
HPT	Health Physics Technician
HEC	High Energy Cell
HLC	High Level Cell
AS	King Avenue Site
IAA	Independent Assessment Audit
LDE	Lens Dose Equivalent
LLC	Low Level Cell
LSA	Low Specific Activities
MTC	Mechanical Test Cell
NRC	Nuclear Regulatory Commission
PC	Protective Clothing
QA	Quality Assurance
RAR	Radiological Awareness Report
RC&ESHO	Regulatory Compliance & Environmental, Safety, Health Operations
RFOM	Radiological Field Operations Manager
RSO	Radiation Safety Officer
RTSM	Radiological Technical Support Manager
RWP	Radiation Work Permit
SDE	Shallow Dose Equivalent
TLD	Thermoluminescence Dosimeters
WJS	West Jefferson Site

LICENSEE DOCUMENTS REVIEWED

Radiation Protection Program, DD-90-02, Revision 3, August 2000

Licensee Report, High Level Cell and Low Level Cell Hydraulic Doors and Hydraulic Door Room JN-1A

November 28, 2000, Memorandum from ALARA Coordinator to Radiological Field Operations Manager (FROM) "ALARA-DDE, SDE, LDE, and Extremity Data Comparison, 3rd Quarter CY 2000"

Additional documents utilized for this inspection are specifically identified in the Report Details above.