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The State University of New York

Environment, Health & Safety Services

April 28, 2006

Docket 50-57
License R-77

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington D.C. 20555

Dear Sir or Madam:

Enclosed please find two copies of the 2005 Annual Facility Technical Report for the Buffalo Materials Research Center at the State University of New York at Buffalo. This report is submitted pursuant to Facility Technical Specification Requirement 15.1. If you have any questions or wish further information, please contact me at (716) 829-3301.

Sincerely,

David R. Vasbinder
Director, Buffalo Materials Research Center

Cc: Daniel Hughes, Project Manager USNRC

Thomas Dragoun, USNRC Inspector Region 1

Joseph Raab,	Director Environment, Health, and Safety
Kevin Thompson,	Chairman Reactor Decommissioning Safety Committee
Mike Dupre,	Associate Vice President for University Facilities
Jeff Slawson,	Radiation Safety Officer
Mark Adams,	Operations Manager

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ANNUAL TECHNICAL **REPORT**

STATE UNIVERSITY OF NEW YORK AT BUFFALO

BUFFALO MATERIALS RESEARCH CENTER

License R-77

Docket 50-57

Calendar Year 2005

Submitted by:

David R. Vasbinder
Director

April 28, 2006



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1. INTRODUCTION

This report is submitted to the United States Nuclear Regulatory Commission (NRC) pursuant to section 15.1 of Appendix A, of the Technical Specifications (License R-77) for the Buffalo Materials Research Center (BMRC) located at the State University of New York at Buffalo. It summarizes changes to the facility, major maintenance activities, surveillance tests and inspections, radiation surveys, and radioactive effluents for the 2005 calendar year. The facility remained in Possession Only License status throughout the year. All required surveillance was completed.

2. MAJOR MAINTENANCE

Several routine maintenance activities were undertaken in the B.M.R.C. However, there were no maintenance activities undertaken in 2005 that would qualify as major maintenance.

The major activity undertaken in calendar year 2005 was the transfer, packaging, and shipment of the reactor spent fuel to a Department of Energy facility pursuant to N.R.C. regulations. The fuel was successfully shipped in conjunction with United States Department of Energy personnel and a contractor.

3. 10CFR 50.59 CHANGES

There were no 50.59 reviews performed during the 2005 calendar year.

4. RADIOACTIVE EFFLUENTS

4.1 Controlled Discharges to the Sanitary Sewer

There were two controlled discharges to the sanitary sewer system in 2005. The total volume of water released was 60,200 liters, containing a total of approximately 0.013 millicuries of radioactivity. Both releases were from the 10,000 gallon above ground waste storage tank (referred to as 10K Tank). Tables 1 and 2 contain the discharge information specific to the releases including comparisons to the monthly average concentration in 10 CFR Part 20, Appendix B, Table 3 "Releases to Sewers" and the sum of the fractions.

4.2 Airborne Releases

No airborne radioactive releases, other than natural background resulting from radon and its daughter products, were made during 2005. A sensitivity determination ($\mu\text{Ci/cc/cpm}$) of the building air system (based on the injection of a known quantity of Kr-85 gas) was performed prior to moving reactor fuel. There were no releases resulting from the spent fuel removal activities.



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5. ENVIRONMENTAL RADIOLOGICAL SURVEYS

5.1 Routine Surveys

The direct radiation levels outside the BMRC reactor building are routinely monitored adjacent to the "truck door" access area and on the roof of the liquid waste holding tank vault.

Global Dosimetry Solutions dosimeters are used to monitor integrated radiation levels in six exterior areas around the facility and six locations within the building itself. These dosimeters are replaced with a new badge every month and the previous month's badge is sent to the dosimetry vendor for processing. The vendor is NVLAP certified. The minimum photon sensitivity for the dosimeters is 5 mrem.

Tables 3 lists the cumulative annual summary of the environmental radiation dose equivalent from the environmental badges located around the facility. The maximum cumulative annual deep dose equivalent reading was 34 mrem on the dosimeter (# 2116) located on the roof of the vault containing the above ground waste holding tank.

Table 4 lists cumulative annual summary of the radiation dose equivalent from the area dosimetry badges located within the building. The maximum cumulative annual deep dose equivalent reading was 90 mrem on the dosimeter (# 2815) located on the bridge located directly above the reactor pool.

Semi-annual "tell-tale" samples are drawn and analyzed from the sampling well tubes adjacent to the underground liquid waste holding tanks (Tank #1). These analyses detected no radioactivity in excess of background levels.

6. RADIATION EXPOSURES

6.1 External Dosimetry

Dosimetry records were maintained for a total of seven staff members and other authorized facility entrants. Film dosimeters provide X, beta, and gamma exposure monitoring. Thermoluminescent dosimeter (TLD) rings are used to measure extremity dose for selected personnel. Also, a TLD for neutron detection is available when necessary. All dosimeters are processed by Global Dosimetry Solutions, a NVLAP certified vendor. These dosimeters are replaced on a bi-monthly basis.

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The film dosimeters have a minimum sensitivity of 10 mrem for both beta and photon radiation. A separate neutron sensitive dosimeter (with a minimum sensitivity of 20 mrem per monitoring period) is available and is worn by personnel during manipulations involving the reactor fuel or plutonium - beryllium (PuBe) sources.

During 2005 no monitored individual received a measurable whole body deep dose equivalent.

University Police Department officers perform routine security tours of the building. The patrol officers wear a University Police dosimeter pack when they perform these walkthroughs. These dosimeters did not record any dose equivalent during 2005.

Four visitor dosimeter packs are also available. These dosimeters are issued to visitors who may need to enter into areas requiring exposure monitoring. None of these visitor dosimeters recorded any measurable dose equivalent in 2005.

Tables 5 and 6 provide summaries of personnel whole body and extremity dose for the spent fuel shipping activities performed in calendar year 2005. There was no whole body dose received by any of the BMRC, University at Buffalo, Department of Energy, or Contractor staff working on the project. Extremity dose was received by four BMRC staff members and two contractor personnel. The maximum extremity dose was 100 mRem received by one of the contractor staff.

7. RADIATION AND CONTAMINATION SURVEYS

7.1 Exit Monitoring

Exit monitoring is required as part of each egress from the reactor containment building and other radioactive materials areas within the BMRC. These surveys occasionally detect radioactive contamination, allowing rapid correction of contamination problems.

7.2 Routine Surveys

The BMRC staff performs monthly radiation and contamination surveys of the BMRC building. In calendar year 2005, contamination was detected in three controlled areas during one of these monthly surveys. These areas were subsequently cleaned and re-surveyed.



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8. MISCELLANEOUS

- The Reactor Decommissioning Safety Committee convened three times during calendar year 2005. This meets the annual requirement in Facility Technical Specifications for a minimum of two committee meetings.
- The fuel shipment activities and paperwork were inspected by the N.R.C. inspector during the time of the packaging and transport. All paperwork and activities were determined to be in compliance.
- Several requests for information pertaining to facility security were received from the N.R.C. during 2005. All information requested was supplied.



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Table 1 -- Waste Tank Release to Sanitary Sewer

Release Number: 2005-01
From: 10K Tank
Month: February

Amount Released: 7800 gal.
2.96 E+07 ml
Date of Release: 2/25/05

Nuclide	Tank ($\mu\text{Ci/ml}$)	Monthly Limit ($\mu\text{Ci/ml}$)	Release ($\mu\text{Ci/ml}$)	Percent of Monthly Limit
Ag-108m	6.00E-08	9E-05	1.0E-09	1.1E-03
Unidentified Beta	1.94E-07	2E-08	3.3E-09	1.7E+01

TOTAL 2.54E-07 $\mu\text{Ci/ml}$

Total of Limit
Released: 16.60 %

Total of
Activity
Released: 7.53 μCi

Year to Date
Activity
Released 26.91 μCi



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Table 2 -- Waste Tank Release to Sanitary Sewer

Release Number: 2005-02
From: 10K Tank
Month: May

Amount Released: 8050 gal.
3.06E+07 ml
Date of Release: 10/14/05

Nuclide	Tank ($\mu\text{Ci/ml}$)	Monthly Limit ($\mu\text{Ci/ml}$)	Release ($\mu\text{Ci/ml}$)	Percent of Monthly Limit
Ag-108m	4.07E-08	9E-05	2.2E-09	2.4 E-03
Unidentified	1.44E-07	2E-08	7.6E-09	3.8 E+01
Beta				

TOTAL 1.85E-7 $\mu\text{Ci/ml}$

Total of Limit Released: 38.22 %

Total of Activity Released: 5.66 μCi

Year to Date Activity Released 13.20 μCi



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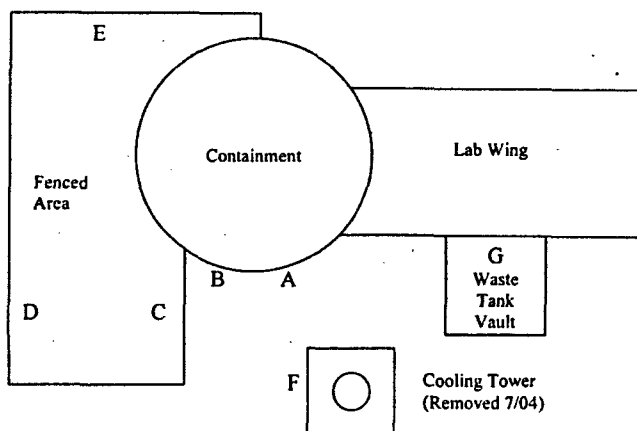
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**Table 3 -- 2005 Cumulative Summary of Environmental
Radiation Dose Equivalent (mrem)**

Monthly Monitoring Period	A	B	C	D	E	G	Control Average
	Truck Right 2119	Truck Left 2118	Fence 1 2120	Fence 2 2121	Fence 3 2122	Waste Vault 2116	
January	0	1	1	2	2	4	10
February	1	0	2	2	3	4	10
March	0	0	0	1	2	6	12
April	0	0	1	1	1	1	11
May	0	0	1	2	2	2	10
June	0	0	0	1	1	0	10
July	0	0	1	2	2	2	13
August	0	0	0	1	1	0	10
September	1	1	0	0	0	0	14
October	0	0	0	2	1	7	12
November	1	0	0	2	2	6	14
December	0	0	0	1	1	2	13
Total	3	2	6	17	18	34	

Dose equivalent reported is subtracted from control average.



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Table 4 -- 2005 Cumulative Summary of BMRC Area Dosimeter Results

Monthly Monitoring Period	Truck Door 335	Control Room (neutron) 2816	Bridge (neutron) 1624	Bridge 2 (neutron) 2815	Building Air 357	Stack Gas 356	Control Average (non-neutron badges)
January	1	0	0	0	0	5	10
February	1				1	5	10
March	0	0	0	0	0	5	12
April	1				0	4	11
May	1	0	0	15	0	5	10
June	1				0	3	10
July	1	0	12	30	0	5	13
August	4				0	4	10
September	9	47*	17*	30*	0	2	14
October	0				0	3	12
November	2	0	24	15**	0	2	14
December	1				0	3	13
Total	22	47	29	90	1	46	

Dose equivalent reported is subtracted from control average.

* Deep dose equivalent, no neutron dose. Exposure due to spent fuel shipment.

** Deep dose equivalent, no neutron dose.



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Table 5 -- 2005 Spent Fuel Shipment Whole Body Deep Dose Equivalent Summary

Deep Dose Equivalent (rem)	BMRC Staff	University Police	Visitor	Fuel Handler Dosimeter	Contractor and Other
None Measurable	8	1	4	2	12
0.001 to 0.010	0	0	0	0	0
0.011 to 0.100	0	0	0	0	0
> 0.100	0	0	0	0	0

Table 6 -- 2005 Spent Fuel Shipment Extremity Shallow Dose Equivalent Summary

Extremity Shallow Dose (rem)	BMRC Staff	Contractor and Other
None Measurable	4	4
0.010 to 0.100	4	2
> 0.100	0	0