

# HOWARD UNIVERSITY

OFFICE OF THE SENIOR VICE PRESIDENT  
AND EXECUTIVE DEAN FOR HEALTH SCIENCES  
RADIATION SAFETY OFFICE

June 21, 2012

Betsy Ullrich, MS, CHP  
Senior Health Physicist, RI  
U.S. Nuclear Regulatory Commission  
2100 Renaissance Blvd  
King of Prussia, PA 19406  
(610) 337-5040

**SUBJECT: AMEND LICENSE 08-00386-19  
TO REMOVE RADIOACTIVE WASTE  
STORAGE FACILITY COLLEGE  
STREET 510 – ADDITIONAL  
INFORMATION REQUESTED 6/18/12**

Dear Ms. Ullrich:

Thank you so much for your prompt email response. I am providing the additional information requested by you on 6/18/12 to support my previous request submitted on 6/12/2012 for an amendment to the Howard University License Number 08-00386-19 to remove the Waste Facility 510 College Street from the license.

Explanations on each requested item are as follows:

1.
  - a. Please explain what the actual dimensions of the room are, and explain what the dimensions in Figure 1 refer to, if they are not the dimensions of the waste storage area.

We re-measured the room area inside the waste facility. The actual dimension is about 24.5 ft. by 19 ft. (~465.5 ft. <sup>2</sup>).

- b. Please use diagrams that show the dimensions of the room more accurately, with the location of survey points.

Please see attached



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Betsy Ullrich, MS, CHP

Senior Health Physicist, RI

U.S. Nuclear Regulatory Commission

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2. The count rate survey appears to be the survey you want to use to document the total residual contamination levels. (Please note that the total residual contamination is more difficult to measure with a count rate meter, and would have been easier to do with a survey instrument set in scaler mode.) All the results you provided were in CPM (counts per minute), however, your results should be in DPM and should be compared to the screening values for your most conservative radionuclide with a half-life greater than 120 days; in this case, your limiting radionuclide would be carbon-14, and the screening value is  $3.7 \text{ E}6$  dpm per 100 square-centimeters area. Please provide your results in dpm/100 sq.-cm for your fixed readings.

**As of now, we do not have any survey meter which is calibrated to count fixed background values using the scaler mode. Therefore, it is difficult to convert count obtained from the count rate meter into dpm. If it is not possible to waive this requirement, we will submit it later on once the meter is calibrated. We do have a meter Ludlum Model 2200 which needs to be calibrated.**

3. The survey results for removable contamination were reported in dpm per swipe. State the area that was swiped and report the results in dpm/100 sq.-cm. If the swipe results need to be adjusted, re-submit the results. (Please note that the residual removable contamination levels must not exceed 10% of the total residual contamination screening value.)

**Please see attached.**

4. Plotting the results of your surveys on the diagrams provided show elevated total residual CPM in the back right-side corner of the diagram; and removable counts above background in the same area, as well as in the area near the table and door. Especially if residual activities were closer to the screening values, such plots are useful in identifying areas that may require additional attention. No response to this item is required at this time, because the removable contamination levels were well below the screening value.

**Response not required at this time per your instructions.**

5. The minimum detectable activity was not specified for the count rate meter used for total fixed residual contamination measurements, or for the gamma counter and LSC used for removable contamination levels. Please provide that information.

**Please see attached.**

6/21/12

Betsy Ullrich, MS, CHP  
Senior Health Physicist, RI  
U.S. Nuclear Regulatory Commission  
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Thank you for your time and consideration in this matter. Please feel free to contact me directly should you need any additional information.

Sincerely,



Satya R. Bose, Ph.D., DABR  
Director of Radiation Safety  
& Radiation Safety Officer

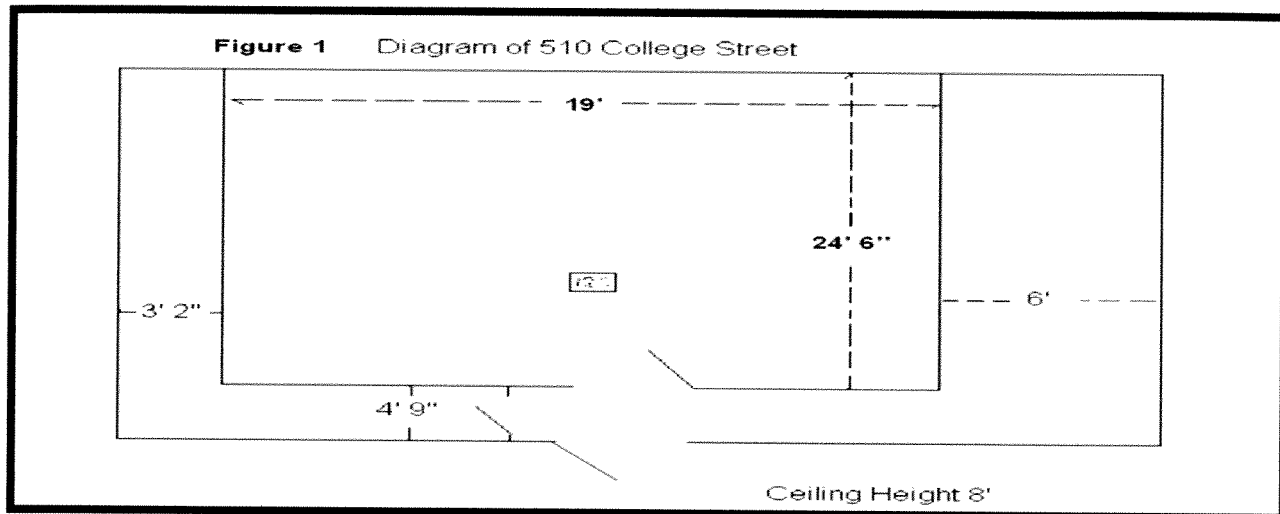
Cc: Sergei A. Nekhai, Ph.D.  
Chair, Radiation Safety Committee  
Department of Medicine, Associate Professor  
Center for Sickle Cell Disease, Co-Director

Alice A. Mahan  
Department Executive Officer for Radiology,  
Radiation Oncology & the Cancer Center

Wayne A. I. Frederick, M.D., F.A.C.S., MBA  
Deputy Vice-Provost for Health Sciences  
Howard University

# Close Out Survey

## 510 College Street



### Summary

#### Close-Out Survey Report for Radioactive Waste Storage Facility 510 College Street

##### History :

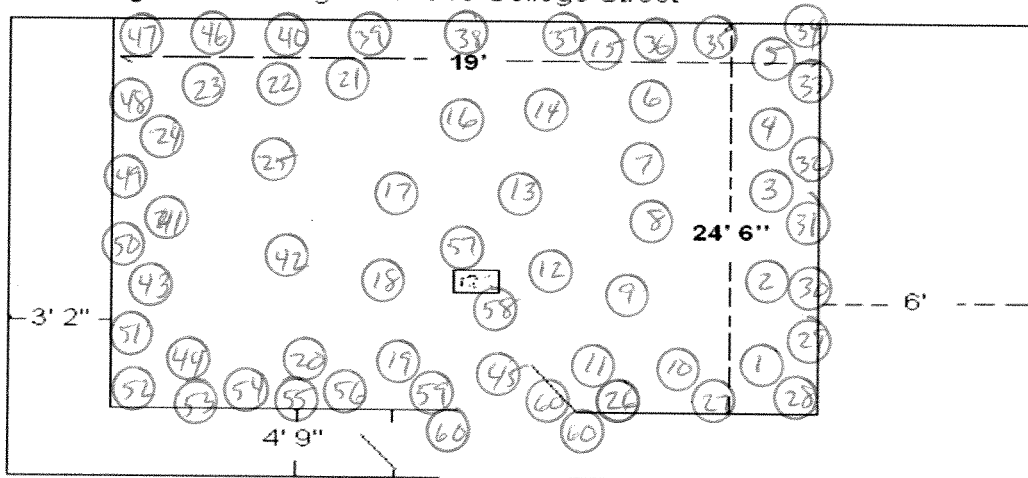
The storage area in 510 College Street was established for placing radioactive waste material generated in research labs on the campus of Howard University. Material was placed inside 55 gal metal drums, 35 gal metal drums and in recent years 55 gal poly drums for liquid waste. The drums were placed on 2x4 broods to keep the drums off the floor surface and heavy gaged plastic bags were placed inside each drum and then bags of waste were placed inside the heavy gaged plastic bags.

The primary use of the radioactive waste storage facility was to house the radioactive waste in our decay and storage management program. Isotopes with a half-life less than 90 days were stored in area for 10 half-lives and then surveyed and released i.e. P-32, P-33, I-125 and S-35. The storage area was also used to fill drums of C-14 and H-3, once filled the filled drums were moved to 500 College St waste facility until disposed by a radioactive waste vendor.

**Routine Radioactive Monitoring** Routine surveys were conducted on a weekly and quarterly basis during the period of authorization to house radioactive material and consisted of a loose contamination and dose rate survey.

# Close Out Survey

**Figure 1** Diagram of 510 College Street



Ceiling Height 8'

**Comments:**

A comprehensive loose contamination survey was conducted in 510 College St. Survey locations are indicated on map followed by results for each location indicated on spreadsheet.

Swipes were counted in a well counter for gamma radiation and on a LSC for low level beta radiation.

There is no history of alpha emitters being stored in this area during the use.

Types of radioactive waste stored in 510 College Street: I-125, P32, P-33, S-35, H-3, and C-14

### Survey Meters Used

Meter	Calibration Date
Biodex Atomlab MCA, Model 187-225	
Perkin LSC Counter	
Fixed Contamination Ludlum #59790	4/26/2012
Dose Rate Meter Ludlum #72726	1/4/2012

Surveyor:

Michael W. Smith  
Radiation Safety Technician

Date: 6/21/12

Reviewed By:

Satya Koojin Bose  
Dr. Satya Bose Ph.D.  
Radiation Safety Officer

Date: 6/21/12

# Loose Contamination Results

Location of Measurement	Swipe #	Gamma Counter Results		LSC Counter Results	
		CPM	DPM	CPM	DPM
Floor	1	-8	-22.4	4	10.0
Floor	2	-10	-28.0	-2	-5.0
Floor	3	2	5.6	0	0.0
Floor	4	-14	-39.1	4	10.0
Floor	5	2	5.6	4	10.0
Floor	6	9	25.2	-1	-2.5
Floor	7	-12	-33.6	-1	-2.5
Floor	8	-3	-8.4	-2	-5.0
Floor	9	11	30.8	-2	-5.0
Floor	10	5	14.0	-6	-15.1
Floor	11	-17	-47.5	0	0.0
Floor	12	-4	-11.2	4	10.0
Floor	13	-10	-28.0	7	17.6
Floor	14	-26	-72.7	-9	-22.6
Floor	15	1	2.8	-4	-10.0
Floor	16	-2	-5.6	1	2.5
Floor	17	-2	-5.6	-3	-7.5
Floor	18	-3	-8.4	9	22.6
Floor	19	17	47.5	-5	-12.5
Floor	20	0	0.0	-4	-10.0

DPM = (cpm-backgroundcpm)/meter efficiency

DPM results are in dpm/100cm<sup>2</sup>

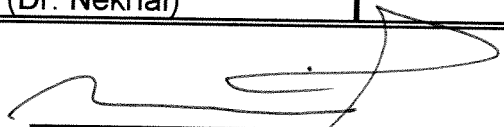
Gamma Trigger Limit (dpm) = 552.3

Beta Trigger Limit (dpm) 200.7

## Survey Meters Used

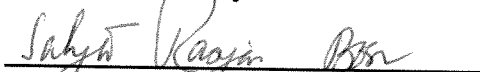
Meter	Efficiency	MDA(dpm)
Biodex Atomlab MCA, Model 187-225	36%	124.2
Perkin LSC Counter (Dr. Nekhai)	39%	73.7

Surveyor:

  
 Michael W. Smith  
 Radiation Safety Technician

Date: 6/21/12

Reviewed By:

  
 Dr Satya Bose Ph.D.  
 Radiation Safety Officer

Date: 6/21/12

# Loose Contamination Results


Location of Measurement	Swipe #	Gamma Counter Results		LSC Counter Results	
		CPM	*DPM	CPM	*DPM
Floor	41	-17	-47.5	-5	-12.5
Floor	42	-2	-5.6	-5	-12.5
Floor	43	2	5.6	11	27.6
Floor	44	-6	-16.8	2	5.0
Floor	45	4	11.2	-6	-15.1
Wall	46	4	11.2	10	25.1
Wall	47	-12	-33.6	7	17.6
Wall	48	-4	-11.2	-1	-2.5
Wall	49	-21	-58.7	-6	-15.1
Wall	50	1	2.8	15	37.6
Wall	51	0	0.0	1	2.5
Wall	52	8	22.4	-1	-2.5
Wall	53	-18	-50.3	15	37.6
Wall	54	4	11.2	-2	-5.0
Wall	55	0	0.0	-9	-22.6
Wall	56	-17	-47.5	1	2.5
Wall	57	-13	-36.4	7	17.6
Wall	58	-16	-44.7	8	20.1
Wall	59	-14	-39.1	-9	-22.6
Wall	60	-1	-2.8	-2	-5.0

DPM = (cpm-backgroundcpm)/meter efficiency  
 Gamma Trigger Limit (dpm) = 552.3

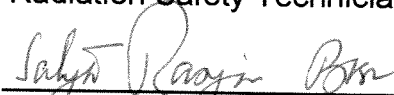
DPM results are in dpm/100cm<sup>2</sup>  
 Beta Trigger Limit (dpm) 200.7

## Survey Meters Used

Meter	Efficiency	MDA(dpm)
Biodex Atomlab MCA, Model 187-225	36%	124.2
Perkin LSC Counter (Dr. Nekhai)	39%	73.7

Surveyor:   
 Michael W. Smith  
 Radiation Safety Technician

Date: 6/21/12

Reviewed By:   
 Dr Satya Bose Ph.D.  
 Radiation Safety Officer

Date: 6/21/12

# Loose Contamination Results

Location of Measurement	Swipe #	Gamma Counter Results		LSC Counter Results	
		CPM	*DPM	CPM	*DPM
Floor	21	-14	-39.1	1	2.5
Floor	22	1	2.8	-6	-15.1
Floor	23	1	2.8	-7	-17.6
Floor	24	-1	-2.8	0	0.0
Floor	25	-14	-39.1	-2	-5.0
Wall	26	-5	-14.0	9	22.6
Wall	27	2	5.6	-3	-7.5
Wall	28	-16	-44.7	-8	-20.1
Wall	29	-15	-41.9	-2	-5.0
Wall	30	-10	-28.0	5	12.5
Wall	31	1	2.8	-8	-20.1
Wall	32	4	11.2	0	0.0
Wall	33	-1	-2.8	5	12.5
Wall	34	-6	-16.8	-3	-7.5
Wall	35	9	25.2	3	7.5
Wall	36	-14	-39.1	9	22.6
Wall	37	-2	-5.6	5	12.5
Wall	38	-13	-36.4	-1	-2.5
Wall	39	-3	-8.4	0	0.0
Wall	40	-7	-19.57	-8	-20.07

DPM = (cpm-backgroundcpm)/meter efficiency  
 Gamma Trigger Limit (dpm) = 552.3

DPM results are in dpm/100cm<sup>2</sup>  
 Beta Trigger Limit (dpm) 200.7

## Survey Meters Used


Meter	Efficiency	MDA(dpm)
Biodex Atomlab MCA, Model 187-225	36%	124.2
Perkin LSC Counter (Dr. Nekhai)	39.9%	73.7

Surveyor:

  
 Michael W. Smith  
 Radiation Safety Technician

Date: 6/21/12

Reviewed By:

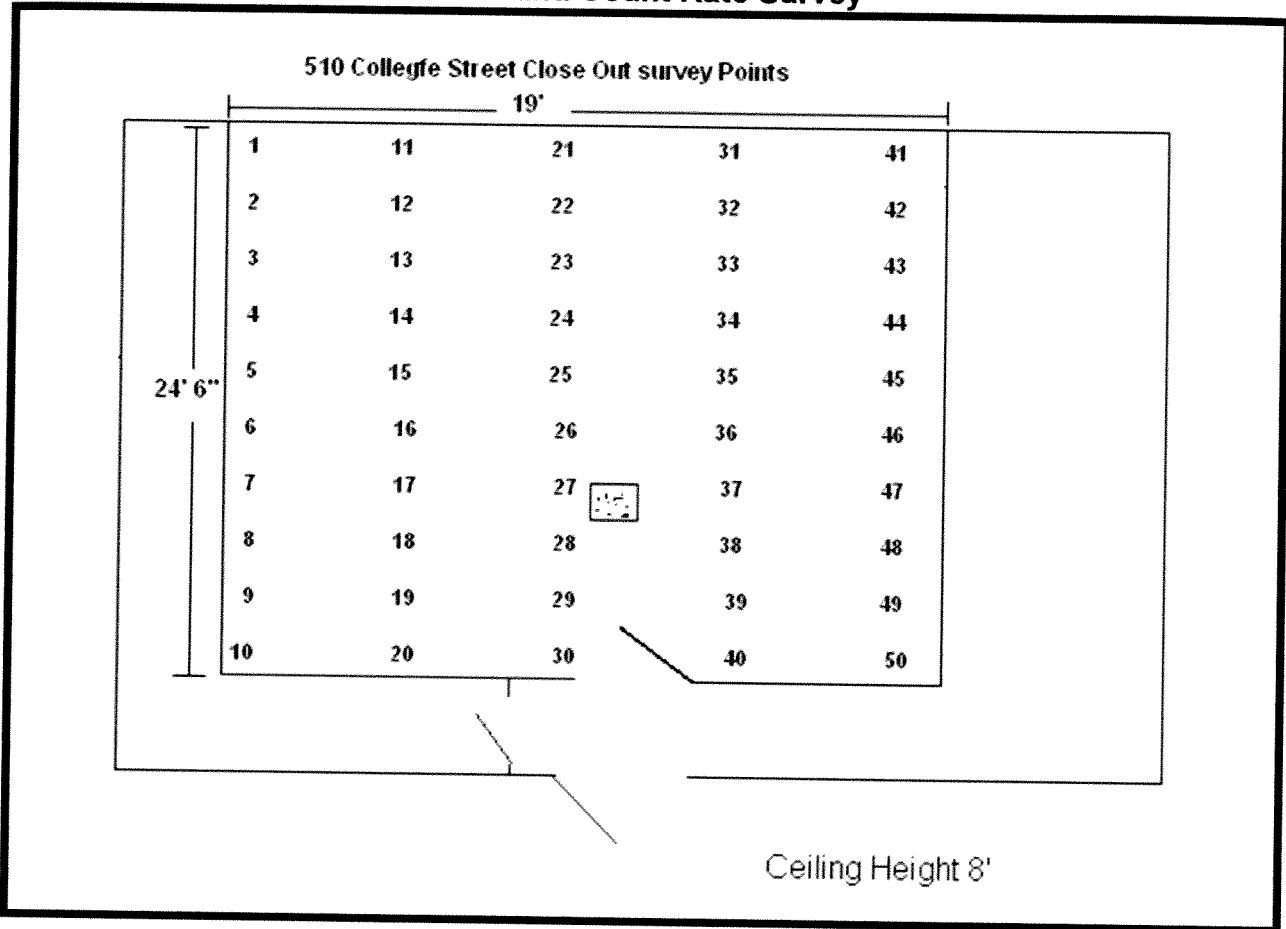
  
 Dr Satya Bose Ph.D.  
 Radiation Safety Officer

Date: 6/21/12



# Close Out Survey

## Dose Rate and Count Rate Survey



**Comments:**

A comprehensive dose rate and fixed contamination radiation survey was conducted using a exposure rate survey meter and a count rate survey meter with a scintillation probe. Survey locations are indicated on map and survey results follow on results spreadsheet. Count Rate readings were taken 3inches above ground level and each reading was taken after a minute count. A 100% scan of the surface area was conducted using a count rate meter with scintillation probe attached. Dose Rate readings were taken at 4 feet above ground level. Background count rate reading is 300cpm, background general area dose rate reading is <0.01mR/hr.

Surveyor:

Michael W. Smith  
Radiation Safety Technician

Date: 6/21/12

Surveyor:

Olumide Owoade  
Radiation Safety Technician

Date: 06/21/12

Reviewed By:

Satya Bose  
Dr. Satya Bose Ph.D.

Date: 6/21/12

Radiation Safety Officer

# Reading Results

Sample #	CPM Reading	Dose Rate Reading mR/hr
1	300	<0.01
2	300	<0.01
3	300	<0.01
4	320	<0.01
5	320	<0.01
6	300	<0.01
7	300	<0.01
8	300	<0.01
9	300	<0.01
10	300	<0.01
11	300	<0.01
12	300	<0.01
13	300	<0.01
14	300	<0.01
15	300	<0.01
16	300	<0.01
17	300	<0.01
18	300	<0.01
19	300	<0.01
20	300	<0.01
21	300	<0.01
22	340	<0.01
23	360	<0.01
24	300	<0.01
25	300	<0.01

Sample #	CPM Reading	Dose Rate Reading mR/hr
26	300	0.01
27	300	<0.01
28	300	<0.01
29	300	<0.01
30	300	<0.01
31	360	0.01
32	360	0.01
33	400	0.01
34	300	<0.01
35	300	<0.01
36	300	<0.01
37	300	<0.01
38	300	<0.01
39	300	<0.01
40	300	<0.01
41	300	<0.01
42	400	0.01
43	450	0.01
44	300	<0.01
45	300	<0.01
46	300	<0.01
47	300	<0.01
48	300	<0.01
49	300	<0.01
50	300	<0.01

Survey Meters Used		
Meter		Calibration Date
Fixed Contamination Ludlum #59790		4/26/2012
Dose Rate Meter Ludlum #72726		1/4/2012

Surveyor: \_\_\_\_\_

Michael W. Smith  
Radiation Safety Technician

Date: 6/21/12

Surveyor: \_\_\_\_\_

Olumide Owoade  
Radiation Safety Technician

Date: 06/21/12

Reviewed By: \_\_\_\_\_

Dr. Satya Bose Ph.D.  
Radiation Safety Officer

Date: 6/21/12