HOWARD UNIVERSITY

RADIATION SAFETY OFFICE

Br. 1

November 4, 2013

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

03011063 03001321

SUBJECT: AMEND LICENSE NUMBER 08-00386-19 AND 08-03075-07 TO REMOVE RADIOACTIVE WASTE STORAGE FACILITY LOCATED IN ANNEX-I

Dear Ms. Ullrich:

RLJ 08 RLJ

RLJ 03075-07

I am requesting an amendment to Howard University License Number 08-00386-19 and ~~08-03075~~ to remove the Waste Facility located in Annex-I from the licenses. The amendment is requested because the Waste Facility is no longer being used for the storage of low level radioactive waste generated by the research labs at Howard University. The address of the facility is as follows:

Waste Facility in Annex-I
Howard University - Washington, DC 20060

The Radiation Safety Committee discussed plans for closing the facility and all members agreed with the plan and voted unanimously to close the facility.

Upon receiving your approval to amend these licenses, the waste facility will be released to the University for Non-restricted Use.

2041 Georgia Avenue, NW
Suite 6000 Towers Bldg.
Washington, DC20060

p: (202) 806-7216
f: (202) 806-5432

REC'D IN LAT 11/5/13

582468/582469
NMSS/RGN1 MATERIALS-002

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

Attachment:

1. Close-Out Report of Annex-I Waste Storage Facility

Cc: Wayne A. I. Frederick, M.D., F.A.C.S., MBA
Provost and Chief Academic Officer
Howard University

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

CLOSE-OUT REPORT OF
ANNEX-I WASTE STORAGE FACILITY

I. Introduction

The premises to be released consist of a part of building in Annex-I in Howard University Campus. This facility located in the basement of Annex-I was established for storage of low level radioactive waste material generated in research labs on the campus of Howard University. With the establishment of a new waste storage facility, it has been decided by the Radiation Safety Committee for releasing the facility to the University for Unrestricted Use. As per the decision, the Radiation Safety Office conducted surveys to assure that the facility is releasable for unrestricted use as per the NRC guidelines.

A detailed map of the site is attached (Attachment 1). The size of the storage facility is 11 ft. -6 inch by 6 ft. – 6 inch.

Routine Radioactive Monitoring

Routine weekly surveys were done over the period of activity. The surveys consisted of exposure rate survey and removable contamination survey. More complete version of the routine weekly surveys, were also conducted every quarter. These documented surveys are located in the Radiation Safety Office and are available for review.

Initial Cleaning and Survey

In order to perform this closeout project, the University hired a local vendor, Radiation Service Organization, Inc. (RSO, Inc.) from Laurel, Maryland for disposing existing wastes from this facility. The only materials found in this facility were quench sources with very low level activity (attachment 2). The facility has not been used since then. However, routine weekly and quarterly surveys have been conducted after the initial cleanup.

II. Survey Procedures

Removable contamination, total contamination and exposure rate surveys were conducted.

Total Contamination Surveys

A total of 30 readings were taken inside the facility. The map indicating the locations of the surveys is attached (attachment 3).

Following meters were used for total contamination surveys.

Table: Survey Meters Used for Total Contamination Surveys

	Meter 1	Meter 2
Survey Meter Model	Ludlum Model 3	Ludlum Model 2200
Survey Meter Serial #	S/N 104875	S/N 9016
Probe	44-9, PR 104691	44-2, PR 221417
Detector	GM Pancake	1" x 1" (dia x thick) NaI
Calibration Date	4/3/2013	9/18/2013

A 100% scan of the facility was performed using Ludlum Model 2 meter with a Geiger-Mueller Pancake detector. The detector is sensitive to alpha, beta and gamma-radiation. The probe was held at approximately one cm above the surface. The highest count-rate reading on each location was recorded. Ten readings were taken outside the waste storage facility and in a room adjacent to the waste storage facility to get a better idea of the location-specific background. The background was found to be approximately 48 cpm (attachment 3.1).

A general purpose scaler, Ludlum Model 2200, was also used to determine the fixed contamination. The meter was used with probe 44-2 (scintillator detector). The meter provides a digital display of the counts recorded within a specified period of time. The readings were taken at each location indicated on the map. The readings were taken for one minute in each location. The distance between the probe and the surface was approximately one centimeter. The probe was kept at this fixed distance using a clamp throughout the survey. Ten readings were taken outside the waste storage facility and in a room adjacent to the waste storage facility to determine location-specific background. The average background was found to be 1798 cpm (attachment 3.1).

Exposure Rate Surveys

The following meter was used to determine the exposure rates in the facility:

Table: Exposure Rate Meter Information

Survey Meter Model	Ludlum Model 2
Survey Meter Serial #	S/N 72726
Probe	44-9-18, PR 1960488
Detector	GM Pancake
Calibration Date	12/12/2012

A 100% scan of the floor surfaces was performed using the exposure rate meter. The highest exposure-rate reading on each area was recorded. Ten readings were taken outside the waste storage facility and in a room adjacent to the waste storage facility to be used as a background. The average background was found to be about 0.02 mR/hr (attachment 3.1)

Removable Contamination Surveys

In order to determine the removable contamination present in the surfaces, smear samples were taken. A "S" pattern was used to sample the removable contamination from an area of approximately 100 cm^2. Thirty smears were taken throughout the facility and the location of the smears was recorded (attachment 3).

The smears were first counted on Model 2470-0100 Automatic Gamma Counter to detect possible low level gamma activity. Iodine-129 standard source and a background were counted along with the smears for one minute each. The count-rates were converted to dpm/100cm^2 using the counting efficiency for I-129.

Once the smears have been counted on gamma-counter, they were counted on a Liquid Scintillation Counter to detect removable beta activity. H-3, and C-14 standards and a background were counted along with the smears for one minute each. The count-rates were converted to dpm/100cm^2 using the efficiency for H-3.

IV. Survey Results

The survey results for the removable and total contamination surveys and the associated maps are attached with this report.

Total Contamination and Exposure Rates Survey:

The maximum total contamination was observed to be 120 cpm using a GM Pancake Probe and 3075 cpm using a NaI Scnitillator Probe. The highest exposure rate measured with Ludlum Model 2 was 0.04 mR/hr (see attachment 3.1).

Gamma Counter Results:

The removable contamination using an automatic gamma-counter varied from less than background to 56 dpm/100 cm^2. The results are attached (attachment 3.2).

LSC Results:

Using the Liquid Scintillation Counter, the maximum removable contamination was found to be 26 dpm/100cm^2 (see attachment 3.3).

V. Discussions and Conclusions

Limits

NUREG 1556 Vol 12 Appendix P mentions the criteria of 5000 dpm/100cm^2 total contamination and 1000 dpm/100 cm^2 removable contamination for most beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) to release for unrestricted use.

NRC limits the exposure in unrestricted area to less than 2 mrem/hour.

As an ALARA measure, the following limits—which are, in all cases, lower than the above mentioned limits—are used:

Removable Contamination	2.5 X background (dpm/100cm^2)
Total Contamination	2.5 X Background count rate
Exposure Rates	0.2 mrem/hour

Conclusions

The results of removable contamination, total contamination and the exposure rates surveys appear to be much less than the permissible levels. Upon approvals from NRC this facility may be released for unrestricted use.

VI. Attachments

The attachments mentioned throughout this report are as follows:

Attachment 1	Detailed map of the site
Attachment 2	Quench Sources found in the facility
Attachment 3	Map of the location of survey
Attachment 3.1	Results of total contamination & exposure rate surveys
Attachment 3.2	Results of removable contamination survey (using gamma counter)
Attachment 3.3	Results of removable contamination survey (using LSC)

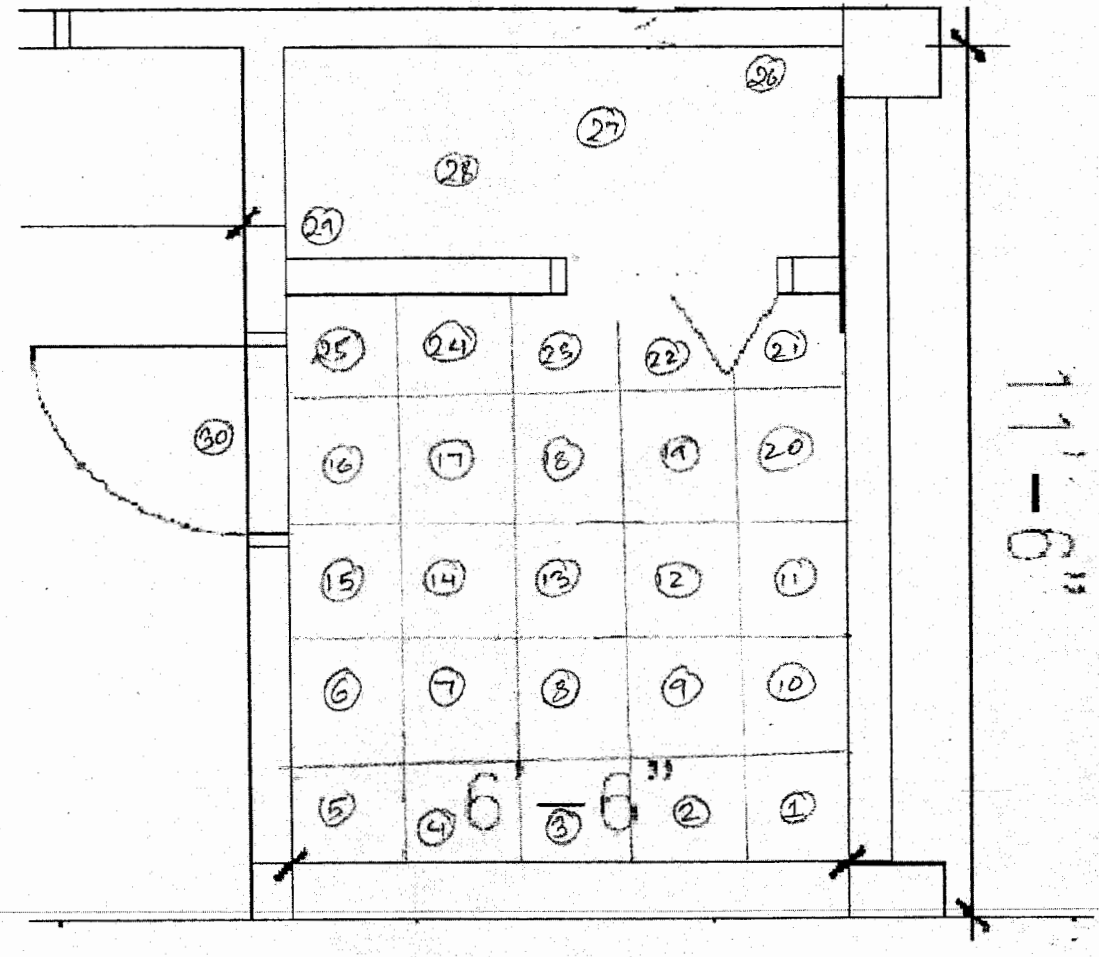
Howard University Annex I Source Inventory						
Type	Isotope	Source ID		Exp. Date	Initial Activity (uCi)	Current Activity
Quench Sources 7 Bottles	H3	Lot # H650	Amersham	5/1/1993	1.6	0.551
Quench Sources 6 Bottles	H3	Lot # H530	Amersham	11/1/1986	1.6	0.382
Quench Sources 9 Bottles	H3		Dupont	Mar-94	0.1	0.036
Quench Sources 1 Bottle	H3	HSSIO		4/24/1974		0.000
Quench Sources 1 Bottle	H3			5/11/1987	0.042	0.010
Quench Source 1 Bottle	H3		Packard	9/1/1979		
Quench Source 1 Bottle	H3	Lot# H297	Amersham	5/1/1983	1.00E+05	dpm
	Total H3					0.979
Quench Sources 1 Bottle	C14			5/1/87	0.017	0.017
Quench Source 1 Bottle	C14	CSSIO		1/1/1974		0.000
Quench Source 8 Bottles	C14	Lot# C600	Amersham	11/1/1987	0.74	5.920
Quench Source 7 Bottles	C14	Lot #C710	Amersham	8/1/1991	0.74	5.180
Quench Source 5 Bottles	C14			5/1/1987	0.017	0.017
Quench Source 1 Bottle	C14		Packard	8/19/1979	0.7	0.697
Quench Source 1 Bottle	C14	Lot# C297	Amersham	6/1/1983	2.44E+04	dpm
Quench Source 10 Bottles	C14		Dupont	10/1/1993	1.00E+05	dpm
	Total C14					11.831

Half Life of C-14 (days) =	2091450
Half Life of H-3 (days) =	4526
Half Life of P32(days) =	14.3
Half Life of I-125 (days) =	59.6
Half Life of S-35 (days) =	87.4

ATTACHMENT 2

Annex I
Radiation Safety Office, Waste Storage Facility

O Approx. location of survey



ATTACHMENT 3

HOWARD UNIVERSITY
ANNEX I, WASTE STORAGE FACILITY
TOTAL CONTAMINATION & EXPOSURE RATES SURVEY

Survey Meters Info

	Meter 1	Meter 2	Meter 3
Survey Meter Model	Ludlum Model 2200	Ludlum Model 3	Ludlum Model 2
Survey Meter Serial #	S/N 9016	S/N 104875	S/N 72726
Probe	44-2, PR 221417	44-9, PR 104691	44-9-18, PR 1960488
Detector	1" x 1" (dia x thick) NaI	GM Pancake	GM Pancake
Calibration Date	9/18/2013	4/3/2013	12/12/2012
Date of Survey	10/21/2013	10/21/2013	10/21/2013

Background

B1	2139 cpm	40 cpm	0.03 mR/hr
B2	2646 cpm	40 cpm	0.02 mR/hr
B3	2659 cpm	60 cpm	0.02 mR/hr
B4	2375 cpm	60 cpm	0.03 mR/hr
B5	1386 cpm	60 cpm	0.01 mR/hr
B6	1361 cpm	40 cpm	0.02 mR/hr
B7	1480 cpm	40 cpm	0.01 mR/hr
B8	1363 cpm	60 cpm	0.01 mR/hr
B9	1334 cpm	40 cpm	0.02 mR/hr
B10	1236 cpm	40 cpm	0.01 mR/hr
Average	1798 cpm	48 cpm	0.02 mR/hr

Survey Results

Map Location #	Survey using Meter 1 Gross Count Rate (cpm)	Survey using Meter 2 Gross Count Rate	Survey Using Meter 3 Exposure Rate (mR/hr)
1	3372	60	0.02
2	3530	80	0.03
3	3574	80	0.04
4	3544	100	0.03
5	3474	60	0.03
6	3528	60	0.02
7	3541	60	0.02
8	3494	60	0.02
9	3407	60	0.03
10	3319	60	0.03
11	3370	60	0.03
12	3092	100	0.03
13	3252	100	0.02
14	3293	100	0.02
15	3160	80	0.04
16	2461	60	0.04
17	3163	100	0.04
18	2981	80	0.03
19	2543	80	0.03
20	2834	120	0.03
21	3353	100	0.03
22	3016	80	0.03
23	2883	80	0.02
24	3003	80	0.03
25	2816	60	0.03
26	2220	60	0.03
27	2373	60	0.02
28	2311	40	0.02
29	2565	40	0.02
30	2770	80	0.02
Range	2220-3574	40-120	0.02-0.04
Average	3075	75	0.03

Surveyed By:

Deepesh Poudel
Jr. Health Physicist
Radiation Safety Office

Olumide O. Owoade
Radiation Safety Technician
Radiation Safety Office

Reviewed By:

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

Please see attached for survey map.

ATTACHMENT 3.1

HOWARD UNIVERSITY
ANNEX-1, WASTE STORAGE FACILITY
REMOVABLE CONTAMINATION SURVEY

Date counted	10/29/2013	Counter Used	2470-0100 Automatic Gamma Counter
Source used	I-129	Calibration Date	2/19/2013
Efficiency	66%		
MDA (dpm)	92.67		
Trigger level (dpm)	603		

Map Location #	Count Rate (cpm)	Removable Contamination (dpm/100cm^2)	Contamination > Trigger level?
Source (I-129)	75396		
Background	160		
1	176	23.8	No
2	175	22.0	No
3	154	0.0	No
4	185	37.8	No
5	141	0.0	No
6	161	1.6	No
7	186	38.7	No
8	155	0.0	No
9	158	0.0	No
10	147	0.0	No
11	172	18.1	No
12	183	34.3	No
13	162	1.9	No
14	145	0.0	No
15	173	18.6	No
16	178	26.1	No
17	166	9.1	No
18	185	37.2	No
19	166	9.2	No
20	166	7.8	No
21	168	10.8	No
22	160	0.0	No
23	181	30.8	No
24	164	5.3	No
25	197	55.5	No
26	156	0.0	No
27	178	25.9	No
28	187	40.4	No
29	159	0.0	No
30	130	0.0	No
Range	130-197		
Average	167		

Surveyed by: Deepesh Poudel
Deepesh Poudel
Jr. Health Physicist

Reviewed by: Satya Ranjan Bose
Satya R. Bose, Ph.D., DABR
Radiation Safety Officer

See attached for printout of survey results.

ATTACHMENT 3.2

Protocol ID	6	Protocol name	RSO Misc C	Run ID	1581	10/29/2013 10:56

Pos	Time	Any Isotope CPM
1	60	75395.93
2	60	160.34
3	60	176.15
4	60	174.95
5	60	153.54
6	60	185.44
7	60	141.12
8	60	161.38
9	60	186.05
10	60	154.96
11	60	158.45
12	60	146.55
13	60	172.39
14	60	183.16
15	60	161.62
16	60	144.78
17	60	172.71
18	60	177.69
19	60	166.4
20	60	185.09
21	60	166.48
22	60	165.5
23	60	167.55
24	60	160.16
25	60	180.82
26	60	163.85
27	60	197.25
28	60	155.57
29	60	177.54
30	60	187.2
31	60	158.75
32	60	129.96

original file C:\Documents and Settings\All Users\Documents\Wizard2\001581.csv
file saved as C:\Data\Wizard2\RSO Misc Contamination Checks1581

HOWARD UNIVERSITY
ANNEX - I, WASTE STORAGE FACILITY
REMOVABLE CONTAMINATION SURVEY

Date counted	10/30/2013
Source used	H-3
Efficiency	38%
MDA (dpm)	69.33
Trigger level (dpm)	171

Counter Used: LSC (CCH 321)

Map Location #	Count Rate (cpm)	Removable Contamination (dpm/100cm^2)	Contamination > Trigger level?
Source (H-3)	156775		
Background	26		
1	33	18	No
2	25	0	No
3	22	0	No
4	29	8	No
5	27	3	No
6	36	26	No
7	20	0	No
8	35	24	No
9	25	0	No
10	25	0	No
11	27	3	No
12	19	0	No
13	24	0	No
14	25	0	No
15	33	18	No
16	24	0	No
17	34	21	No
18	25	0	No
19	24	0	No
20	31	13	No
21	25	0	No
22	35	24	No
23	26	0	No
24	30	10	No
25	21	0	No
26	25	0	No
27	26	0	No
28	20	0	No
29	24	0	No
30	27	3	No
Range	19-36		No
Average	27		

Surveyed by: Deepesh Poudel
Deepesh Poudel
Jr. Health Physicist

Reviewed by: Satya Ranjan Bose
Satya R. Bose, Ph.D., DABR
Radiation Safety Officer

See attached for map and printout of survey results.

ATTACHMENT 3.3

) = RSO SURVEY 30 OCT 2013 09:11

R: 6 COMMENT:

SET TIME :	1.00								
3 CALC :	CPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: STD
NT BLANK :	NO	IC#	: NO	REPLICATES :	1	RS232	: OFF
PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1		
NTILLATOR:	LIQUID	LUMEX:	NO	LOW SAMPLE REJ:	0		
LEVEL :	NO	HALF LIFE CORRECTION DATE:			none		

: OPEN WINDOW %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

POS	TIME MIN	H#	WIDE CPM	WIDE %ERROR	LUMEX %	ELAPSED TIME
**-1	1.00	-3.0	156775.0	0.51	0.00	1.58
**-2	1.00	36.2	26.00	39.22	1.24	3.06
**-3	1.00	125.1	33.00	34.82	2.17	4.68
**-4	1.00	123.4	25.00	40.00	3.34	6.28
**-5	1.00	105.4	22.00	42.64	3.50	7.91
**-6	1.00	121.5	29.00	37.14	1.77	9.51
**-7	1.00	134.4	27.00	38.49	1.81	11.14
**-8	1.00	98.4	36.00	33.33	1.85	12.74
**-9	1.00	104.6	20.00	44.72	4.30	14.25
**-10	1.00	90.9	35.00	33.81	1.36	15.84
**-11	1.00	114.4	25.00	40.00	1.82	17.45
**-12	1.00	131.9	25.00	40.00	1.68	18.95
**-13	1.00	132.7	27.00	38.49	1.34	20.46
**-14	1.00	129.7	19.00	45.88	1.59	22.06
**-15	1.00	117.2	24.00	40.82	1.47	23.69
**-16	1.00	111.6	25.00	40.00	1.47	25.29
**-17	1.00	150.8	33.00	34.82	1.22	26.90
**-18	1.00	138.2	24.00	40.82	1.81	28.52
*-1	1.00	123.5	34.00	34.30	0.73	30.24
*-2	1.00	164.0	25.00	40.00	1.12	31.86
*-3	1.00	138.7	24.00	40.82	1.24	33.48
*-4	1.00	119.8	31.00	35.92	1.81	35.09
*-5	1.00	108.9	25.00	40.00	1.46	36.70
*-6	1.00	111.7	35.00	33.81	1.01	38.20
*-7	1.00	126.0	26.00	39.22	1.22	39.83
*-8	1.00	139.0	30.00	36.51	1.06	41.42
*-9	1.00	135.5	21.00	43.64	1.69	43.06
*-10	1.00	114.2	25.00	40.00	1.37	44.68
*-11	1.00	163.1	26.00	39.22	1.47	46.29
*-12	1.00	173.7	20.00	44.72	1.91	47.90
*-13	1.00	128.7	24.00	40.82	1.21	49.53
*-14	1.00	115.1	27.00	38.49	1.42	51.01

This is to acknowledge the receipt of your letter/application dated

11/4/13, and to inform you that the initial processing which includes an administrative review has been performed.

Amendment (08-03075-07)

[X] There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

[ ] Please provide to this office within 30 days of your receipt of this card

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A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 582469.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader