August 31, 2012

AMERICAN UNIVERSITY
WASHINGTON, DC

RISK MANAGEMENT &
ENVIRONMENTAL HEALTH & SAFETY

Elizabeth Ullrich, CHP
U. S. Nuclear Regulatory Commission
2100 Renaissance Boulevard
Renaissance Park
King of Prussia, PA 19406

Re: Application to Possess Radioactive Materials (LN 08-08371-06; DN 030-38560; Control No. 577838)

Ms. Ullrich:

Previously, the American University, located at 4400 Massachusetts Ave., NW in Washington, DC 20016, submitted an application for a radioactive materials license. On July 25, 2012 we received an e-mailed request for additional information from you. The purpose of this letter is to respond to your request and to ask for a change in our proposed organization. The following are the responses:

RAI 1: I need to do a pre-licensing visit to your facility before I can issue a license. Please contact me to set up a date for this.

American University Response: The pre-licensing visit has been scheduled for Sept. 20, 2012 per our recent email interaction.

RAI 2: You provided us with your Radiation Protection Program Plan. With a few exceptions, this is really good information. However, it contains a level of detail that is not required by our guidance; if I list this document in the list of license commitments on your license, any changes that you need to make will require you to amend your license. Based on your use of the Appendix C application form from NUREG 1556, Vol 7, the only sections of the RPP Plan that would need to be referenced are Sections 5.3, the description of your training program, and 5.8, your description of your instrumentation. Most of the other sections address issues for which you are only required to commit to develop, maintain, and implement procedures that meet our Appendices criteria; for these, your RRR Plan descriptions are good, and should be available for inspection; but I don't think you need them as license commitment. You can either request that Appendix D be retracted, and provide me copies of Sections 5.3 and 5.8 separately, or I could list on the license "Letter dated July 2, 20120, with attachments A, B, C, and Attachment D, Sections 5.3 and 5.8 only".

American University Response: Kindly remove Appendix D from the July 2, 2012 license application package. The enclosure with this letter contains the University's commitments in regards to "Training" and "Instrumentation".

RAI 3(a): Attach C lists locations in Hurst and Beeghly; Attachment D.8.2 also mentions a loading dock, but does not list on which building it is located. If you consider the loading dock a place of use or storage, please give me a building name or address.

American University Response: Attachment 2 of Radiation Safety Procedure No. RSP-001, "Radiation Protection Program Plan", has been modified to include Room No.

101/102 in the Hurst building as the location where licensed radioactivity will be received.
The loading dock is attached to the rear of the Beeghly building and is contiguous to Beeghly Room G12 the intended location for radioactive waste storage. The dock provides access to Room G12, but is not otherwise intended for use or storage of licensed radioactivity.

RAI 3(b): Attachment D refers to sealed sources; at the moment you are not requesting any for this specific license, correct?

American University Response: The University will purchase exempt-quantity (10 CFR 30.71, Schedule B) sealed radiation sources for hand-held instrument QC checks, for liquid scintillation internal standards, and for instrument efficiency determinations. Even though a specific license for these sources is not required, they will be handled as described in the relevant sections of RSP-001.

RAI 3(c): Attachment D, Section 5.4.4 contains some incorrect numbers, and these should be corrected whether or not you have Att D listed as a license commitment. Specifically, the ALI for C-14 is 2 E+6 microcuries only for CO; it is 2 E+5 for carbon dioxide and 2 E+3 for all other C-14 labeled compounds. Your documents states that the value of 10% of the ALI for C-14 is 200,000 microcuries, but that would be correct on for carbon monoxide. Similarly, the 10 % value of 1000 microcuries listed for S-35 (listed as S-25) is only correct for S-35 in vapor form.

American University Response: Attachment A of the July 2, 2012 license application package listed the possession of Carbon-14 and Sulfur-25 in any physical form. The note that follows Section 5.4.4 of RSP-001 was intended only as an example methodology for assessing whether radiological controls are required. However, that note should cite the relevant isotopic compound when there are ALI differences. Therefore, the note that follows Section 5.4.4 has been revised to read as follows:

"Note: In general, work with radioactive material in an open area (i.e., without containment, air handling equipment or other controls) in quantities that exceed 10% of the Annual Limit on Intake (ALI) for the radionuclide in question is indicative of the need for internal radiation monitoring. For example, monitoring would be required for the following:

H-3 - 8,000 microcurie
C-14 (carbon monoxide) - 200,000 microcurie
C-14 (carbon dioxide) - 20,000 microcurie
C-14 (labeled compounds) - 200 microcurie
I-125 - 6.0 microcurie
P-32 - 90 microcurie
S-35 (vapor) - 1,000 microcurie
S-35 (sulfide/sulfate) - 2,000 microcurie
I-131 - 5 microcurie

The unity rule should be used to assess monitoring requirements if mixtures of radionuclides are used. The RSO should be

consulted in the event of other potential use conditions or radionuclides."

RAI 3(d): Attachment D, Section 5.12 states that securing a copy of the recipient's license is recommended; please note that 10 CFR 30.41(d) has specific requirements for the documents you must have in order to transfer licensed materials. (either a copy of the license or a statement from the transferee containing certain information, and some other alternates. Please note that this regulation is undergoing rulemaking and requirements may change shortly.)

American University Response: The note that follows Section 5.12 of RSP-001 has been deleted. We will monitor the status of the rulemaking change and will modify the relevant sections of RSP-001 accordingly.

RAI 3(e): Attachment D section 5.14.2 lists records which must be retained until license termination. It is true that those are records that are required to be kept until termination. There are other records also that must be kept until termination, and there are some records that have a 3 year or 5-year retention.

American University Response: Section 5.14 of RSP-001 has been modified to read as follows:

5.14 Radiation Protection Records

5.14.1 The RSO shall maintain records sufficient to:

5.14.1.1 Document implementation of this Plan;

5.14.1.2 Demonstrate compliance with applicable USNRC license and permit requirements; and

5.14.1.3 Identify all areas where licensed materials are used as input to site-wide decommissioning.

5.14.2 The records specified in 10 CFR 20 Subpart L shall be preserved and maintained until license termination or until disposition is authorized by the USNRC.

5.14.3 Prior to license termination, the following records shall be forwarded to the USNRC:

5.14.3.1 Records of radiation surveys as specified in 10 CFR 20.2103(b).

5.14.3.2 Records of information important to the decommissioning of the facility, including authorizations for release of individual buildings for unrestricted use.

5.14.3.3 Records of waste disposal.

5.14.4 All other records shall be maintained for five years, pursuant to American University corporate policy, or the advice of legal counsel, whichever is longer.

RAI 3(f): Attachment D, 8.5 shows a DIS half-life storage duration to be 10 half-lives. Please note that the NRC no longer requires that DIS be held for 10 half-lives, but may be released earlier if the surveys cannot detect any radiation levels above background. A revised license condition will be on your license.

American University Response: Attachment 8.5 of RSP-001 has been changed to reflect the 10 half-lives calculation as a means of estimating storage duration only. The form cell in question has been revised to read as follows: "Storage Duration Estimate: (i.e., Half-life x 10):"

In Attachment B of our July 2, 2012 application, we named Dr. Albert Cheh to serve as the Radiation Safety Officer (RSO) for the University and Ms. Glynnis Bowman to serve as the Alternate Radiation Safety Officer (ARSO). We have since determined that, for operational and availability reasons, a more functional organization would be for Ms. Bowman to serve as the RSO and Dr. Cheh to serve as the ARSO. Therefore, we respectfully request Attachment B be modified accordingly. Resumes for both of these individuals remain as they appeared in the July 2nd package.

Thank you very much for your assistance. If you have any questions, or if I can do anything to facilitate your review of the enclosed application, please do not hesitate to contact me at (202) 885-2714 (bowman@american.edu) or Dr. Cheh, at (202) 885-5950 (acheh@american.edu).

Sincerely,

Glynnis Anne Bowman, CSP, CHMM
Assistant Director,
Environmental Health & Safety

cc: J. Tubman
U.J. Sofia
A. Cheh
D. Nichols

ENCLOSURE

Referenced Sections in Radiation Safety Procedure No. RSP-001, "Radiation Protection Program Plan" that appear in "Appendix C of NUREG-1556, Vol. 7; Suggested Format for Providing Information Requested in Items 5 through 11 of NRC Form 313" that was submitted with the July 2, 2012 license application package.

Section 5.3 of RSP-001: Training in Radiation Protection

5.3.1 All applicable American University students, staff, faculty, visitors and contractors shall receive initial training in radiation protection:

5.3.1.1Prior to being given unescorted access to restricted areas; and

5.3.1.2Refresher training annually thereafter.

5.3.2 Training may consist of General Employee Training (GET), Radiation Worker Training, Visitor Training and/or special briefings, as determined by the RSO.

5.3.3 GET shall be required for all individuals who work within or in the vicinity of a restricted area.

5.3.4 Radiation Worker Training shall be required for individuals who work within a restricted area and with a dose potential of 500 millirem TEDE.

5.3.5 All routine visitors to restricted areas, whether escorted or unescorted, shall receive Visitor Training prior to entering the area and annually thereafter.

Note: Examples of applicable personnel are office workers, cleaning crews, facility maintenance personnel, etc.

5.3.6 Personnel who enter restricted areas infrequently or for reasons other than to do work may, at the discretion of the RSO, receive Visitor Training.

Note: An example of these personnel are visiting professors, consultants or observers who are not assigned to work in the area but who enter the area in order to meet with an Authorized User.

5.3.7 GET, Radiation Worker Training, and Visitor Training programs shall:

5.3.7.1 Address the pertinent requirements of 10 CFR 19, 29 CFR 1910, and 40 CFR 68, as applicable; and

5.3.7.2 Include, as a minimum, the topics shown in Attachment 8.1.

Attachment 8.1 of RSP-001: Required Training Topics

Visitor Training and Hazard Communication Training

1. Identification of radiation postings, labels and barriers.
2. Location of radiologically restricted areas.
3. How to contact and interact with the radiation safety staff.

General Employee Training

1. The type and form of radioactive material present at American University.
2. The location of USNRC and American University radiation protection policies and procedures.
3. Student, employee, management and contractor responsibilities for radiation safety.
4. Identification of radiation postings, labels and barriers.
5. American University emergency preparedness plan
6. How to contact and interact with the radiation safety staff.

Radiation Worker Training

1. Radioactivity and radioactive decay.
2. Characteristics of ionizing radiation.
3. Man-made radiation sources.
4. Acute effects of exposure to radiation.
5. Risks associated with occupational radiation exposures.
6. Special considerations in the exposure of women of reproductive age.
7. Dose-equivalent limits.
8. Modes of exposure - internal and external.
9. Dose-equivalent determinations.
10 Basic protective measures - time, distance, shielding.
11. Specific procedures for maintaining exposures as low as reasonably achievable.
12. Radiation survey instrumentation - calibration, use and limitations.
13. Radiation monitoring programs and procedures.
14. Contamination control, including protective clothing, equipment and work place design.
15. Personnel decontamination.
16. Emergency procedures.
17. Warning signs, labels, barriers and alarms.

18. The type and form of radioactive material present at American University.
19. The location of USNRC and American University radiation protection policies and procedures.
20. Applicable hazardous materials and Department of Labor requirements/procedures.
21. Student, employee, management and contractor responsibilities for radiation safety.
22. American University emergency preparedness plan
23. Responsibilities of students/employees and management.
24. How to contact the radiation safety staff.

Authorized User Training

1. Radiation Worker Training
2. Regulations and license requirements
3. Measurement instruments
4. Radiation Safety Procedures (RSPs)
5. AURM-EHSP-011-2012
6. Documentation and record keeping requirements
7. Waste Management and Disposal

Section 5.8 of RSP-001: Instrumentation

5.8.1 Instrumentation used by the RSO, Radiation Safety Technicians, Authorized Users, students, employees, visitors or contractors for radiation protection purposes shall be:

5.8.1.1 Of sufficient sensitivity and accuracy to assess radiation exposure levels found at American University.

Note: These instruments should provide a response in units of microR per hour, milliR per hour, microrem per hour, millirem per hour, or in other units of exposure rate.

5.8.1.2 Able to detect the presence of radioactivity on surfaces, equipment, clothing, and personnel at all levels typical of those at American University.

Note: These instruments should provide a response in units of counts per minute, counts per second, disintegrations per minute, disintegrations per second, or other units of radioactivity.

5.8.1.3 Of sufficient quantity to support on-going or planned research.

5.8.1.4 Confirmed to be operable prior to each use or once each day for instruments in continuous use.

5.8.2 Instrumentation shall be purchased, tested and calibrated by methods that are consistent with ANSI N323 recommendations, and by vendors that are licensed to offer calibration services pursuant to a USNRC or applicable Agreement State license.

5.8.3 Calibration frequencies for instruments in the active inventory shall be at least once per year or more frequently if so recommended by the instrument vendor.

5.8.4 Calibration and repair records shall be maintained by the RSO for the duration of License No. XX-XXXXX.

RETIREMENT PLAN ELECTION FORM

FOR HR USE ONLY:	Rec'd:
DOH:	Effective:
Initials:	Processed:

STEP 1: PERSONAL INFORMATION

Name _____ AU ID # _____

Department _____ Work Ext. _____

Age: ☐ under 24 ☐ 24 – 49 ☐ 50+

I am: ☐ faculty ☐ full-time staff ☐ part-time staff

Paid: ☐ bi-weekly ☐ monthly

I had a hardship withdrawal from my retirement account in the last 12 months: ☐ Yes ☐ No

For new employees only: I have contributed to an employer-sponsored retirement plan this current calendar year.

☐ Yes: Amount $ _____ ☐ No

STEP 2: ACTION REQUESTED

After one year of working at AU at least 1,000 hours as non-student and at least age 24, employees are automatically enrolled at 1% contribution with 2% university matching contribution invested with Fidelity unless another selection is made below (only applicable to employees hired on or after May 1, 2008).

☐ Elect matched contributions (requirements below)

☐ Elect unmatched contributions

☐ Change contribution percentages and/or investment company selection

☐ Opt out of auto enroll (must also complete Opt Out section on page 2)

STEP 3: MATCHED CONTRIBUTIONS / INVESTMENT COMPANY SELECTION (if eligible)

Requirements: One year working at AU for at least 1,000 hours as a non-student AND at least age 24 **OR** AU Retirement Verification Form approved for one year service waiver AND at least age 24.

Employee Contributions (up to maximum 5% total)		AU Matching Contributions (2-to-1 up to maximum 10% total)	
Fidelity (RFRP)	_____ %	Fidelity	_____ %
TIAA-CREF (RTRP)	_____ %	TIAA-CREF	_____ %

>> Must also complete Steps 5 and 6 <<

STEP 4: UNMATCHED CONTRIBUTIONS / INVESTMENT COMPANY SELECTION

For assistance determining maximum contribution percentages based on the Federal IRS investing limits, please call or e-mail your contact in Human Resources. For example, 2009 IRS limits: $16,500 general and $22,000 for age 50+.

Employee Contributions

Fidelity (RFSP) _____ %

TIAA-CREF (RSSP) _____ %

>> Must also complete Steps 5 and 6 <<

STEP 5: APPLICATIONS (to be completed by New Enrollments only)

Mandatory for enrollment (attach applications for all elected investment companies):

- ☐ Fidelity contributions: Enrollment Form for Fidelity Investments 403(b) Group Custodial Account
- ☐ TIAA-CREF contributions: Enrollment Form for TIAA and CREF Retirement Annuity Contracts

To apply for one year service waiver:

- ☐ AU Retirement Verification Form (completed by prior employer) AND appropriate investment company applications

STEP 6: EMPLOYEE ACKNOWLEDGEMENT

By signing below, I hereby acknowledge that I understand and agree to the following terms and conditions:

1. Beginning with the next available pay period after all required forms and applications are received by HR, I hereby authorize my base annual salary to be reduced by the contribution percentages I elected.
2. If I want to change my elections or I become eligible for a new limit, it is my responsibility to submit a new election form with any necessary applications to HR.
3. If I am delayed in submitting a new election form, I will not receive any retroactive match or withholding amount.
4. Once I become eligible for matching contributions HR may contact me to clarify my investment company preferences and I understand that I may need to complete additional forms at that time.

The University will continue to deduct the amount indicated unless:

1. I request in writing that this agreement be terminated in its entirety (including my standard contribution) or
2. I execute another agreement within the limits established under Sections 403(b) and 425 of the IRS code or
3. I will exceed my maximum contribution in which case HR will automatically limit my percentage to the percentage permitted legally by the IRS.

Signature _____ Date _____

OPT OUT OF AUTO ENROLL

By signing below, I hereby decline to participate in the auto enrollment retirement contribution program and understand the following:

1. My auto enrollment will stop as of the next available pay period after receipt of this form by HR.
2. If I decide to enroll in the retirement plan at a future date, I will submit a new Retirement Election Form and I will not receive any retroactive match or contributions.
3. If this form is received after contributions are made, I will not be reimbursed and the contributions will remain in my Fidelity Investments account.

Signature _____ Date _____