

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

February 7, 2011

REPLY TO A NOTICE OF VIOLATION-ADDENDUM

To Whom It May Concern,

This written response addresses the Open item for additional review and is in addition to the letter dated January 14, 2011 which is contained here in its entirety for your convenience. The NRC staff identified one Open Item for additional review. In the letter dated January 14, 2011 Lawrence Tech's representative inadvertently neglected to address the Open Item discussed in the NRC letter dated December 16, 2010. The Open Item involved a possible failure to confine your possession of byproduct materials to the purposes authorized by your NRC license. Specifically, the NRC identified possible radioactive contamination and a bin containing unknown radioactive materials in your Nuclear Laboratory room. In addition to responding to the violations described in the enclosed Notice, please also provide information regarding the actions you have taken or will take to identify and dispose of these materials, with an expected date when these actions will be complete.

In regard to the shelf with the possible radioactive contamination.

- 1) Unknown Lawrence Tech personnel did not properly clean and dispose of items on a shelf in the Nuclear Laboratory room.
- 2) A radiation consultant was contracted to remediate the shelf.
- 3) The radiation consultant cleaned the shelf and verified that the shelf was clean.
- 4) Full compliance was achieved on January 24, 2011.

In regard to the green colored bin with unknown radioactive materials.

- 1) In fact, none of the items in the bin were unknown radioactive materials. All items were packaged in bottles with manufacturer's labels intact on each bottle.
- 2) Chase Environmental was contacted for a disposal quote.
- 3) A quote from Chase Environmental was obtained and Lawrence Tech is attempting to contact another vendor to get a second quote.
- 4) Target to have items removed and achieve full compliance is March 31, 2011.

Condition A. 11.B of NRC License No. 21-32239-01 authorized a specifically named individual to fulfill the duties and responsibilities of the Radiation Safety Officer (RSO) for the license.

1. Lawrence Tech believed they had an authorized RSO. The previous RSO left Lawrence Tech for employment elsewhere during the term of another Natural Sciences Department Chair and the new Department Chair was not aware there was a lapse in the institution having a responsible RSO.
2. Another faculty member was designated RSO immediately following departure of the licensed RSO, but Lawrence Tech. failed to amend the license.
3. Lawrence Tech. will terminate NRC licensure.
4. License will be Terminated by March 31, 2011

B. Title 10 of the Code of Federal Regulations (CFR) Part 31.5(c)(15) requires, with the exception of the devices listed in subparagraphs (i) and (ii), that any person who acquires, receives, possesses, uses, or transfers byproduct material in a device pursuant to a general license shall assure that the device is tested for leakage of radioactive material at no longer than 6 month intervals or at such other intervals as are specified on the label.

1. Lawrence Tech did not know the equipment had an electron capture detector with 15 millicuries of Ni-63.
2. The electron capture detector was tested October 26, 2010 and found to be in compliance.
3. A log book was created to keep track of testing frequency. The electron capture detector will be tested every six months. The next wipe test is scheduled for March 26, 2011.
5. The equipment was compliant October 26, 2010.

C. Title 10 of the Code of Federal Regulations (CFR) Part 31.5(c)(2) states, in part, that any person who acquires, receives, possesses, uses or transfers byproduct material in a device pursuant to a general license may not hold devices that are not in use for longer than 2 years. The testing required by paragraph (c)(2) of this section need not be

performed during the period of storage only. However, when devices are put back into service or transferred to another person, and have not been tested within the required test interval, they must be tested for leakage before use or transfer. Devices kept in standby for future use are excluded from the 2-year time limit if the general licensee performs quarterly physical inventories of these devices while they are in standby.

1. Lawrence Tech believed that a stored detector was exempt from testing and was also unaware that there was a time limit on detector storage.
2. The detector was tested and found compliant on November 17, 2010.
3. The detector will be removed by a licensed carrier.
4. The detector will be removed by February 28, 2011.

Please feel free to contact me if you require any additional information.

Sincerely,



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Cc: Regional Administrator, Region III  
Hsiao-Ping Moore, Dean, College of Arts and Sciences, Lawrence Tech

Lawrence Technological University- NRC  
License Close-out

# Report

## Introduction

This report details the items found and condition of various radioactive items at the Lawrence Technological University's Nuclear Room on the LTU campus, Southfield, Michigan.

## Background

LTU is in process of closing out its current NRC license. As such, LTU has been instructed to dispose of certain materials. It should be noted that LTU will continue to operate the Nuclear Room, and will not be disposing of the totality of its radioactive inventory.

## Narrative

Peter Grivins of Fenris Radiation Services and Carol Lentz of Chase Environmental arrived at LTU on 24 January 2011 to assess items that are slated for disposal and to assay a quantity of unknown items. The items are housed in the Nuclear Room of Lab 112 on the LTU campus. Peter Grivins met Dr. Anthony Sky of LTU, and proceeded with him to the Nuclear Room to begin the process of quantifying the unknown isotopes. Carol Lentz joined a few minutes later and began to inventory the chemicals and radioactive items to provide information to Chase Environmental for disposal.

All surveyed items were checked with the following instruments:

Type	Make	Model	Serial Number	Efficiency	Background (CPM)
1x1 Gamma Scintillator	Ludlum	3	238047	10%	1000-1500
Beta Pancake	Thermo	FH40G-L	16081	10%	50-100
Alpha Scintillator	Ludlum	3	2278	15%	1

Activity was determined by the following formula:

$$\text{CPM} / \% \text{Efficiency} = \text{DPM} / 2.22\text{e}6 = \text{uCi}$$

**Total activity of unknown salts:**

Gamma- 167,000 CPM, 1,670,000 DPM, **0.75 uCi**

Beta- 88,395 CPM, 883,950 DPM, **0.39 uCi**

**Waste List**

**One generally licensed (15 mc) Ni-63 gas chromatograph ECD (Leak tested in November 2010)**

Hewlett-Packard Model No. G1223A Serial No. F2220

**1-Cs/Ba mini-generator elution solution** – The mini generator looks like a small separation column. **(Image 3 & 4)**

9 uCi of Cs/Ba 137 on July 28 1997

Serial No. 51D26

Manufacturer: Oxford Instruments Inc.

P.O. Box 2560

Oak Ridge, TN 37831 (423) 483-8405

**8 bottles - Uranyl Acetate**

1. Glass Bottle, Solid, 113.4 g Assume Full
2. Glass Bottle, Solid, 113.4 g Unopened
3. Glass Bottle, Solid, 28.3 g Assume Full
4. Glass Bottle, Solid, 28.3 g Assume Full
5. Glass Bottle, Solid, 28.3 g Assume Full
6. Glass Bottle, Solid, 28.3 g Assume Full
7. Glass Bottle, Solid, 458.6 g Assume Full
8. Glass Scintillation Vial (20ml) with powder residue in bottom. Unknown quantity – assume mg quantity at best.

**9 bottles - Uranyl Nitrate**

1. Glass Bottle, Solid, 28.3 g Assume Full
2. Glass Bottle, Solid, Label is unreadable, assume it is a 28.3 g bottle (same size and label characteristics as the 28.3 g bottle) Assume Full
3. Glass Bottle, Solid, 28.3 g Assume Full
4. Glass Bottle, Solid, 113.4 g Assume Full
5. Glass Bottle, Solid, Label is almost destroyed. Unknown quantity, assume 200 g.
6. Glass Bottle, Solid, 113.4 g Assume Full
7. Glass Bottle, Solid, 113.4 g Assume Full
8. Glass Bottle, Solid, No weight listed on label, bottle is same size as 28.3 g bottles
9. Glass Bottle, Solid, No weight listed on label, bottle is same size as 28.3 g bottles

**1 bottle - Uranium Sulphate**

1. Glass Bottle, Solid, No weight listed on label, Assume 200 g

**1 bottle - Thallium Bromide**

1. Glass Bottle, Solid, 50 g Assume Full

**1 bottle - Thorium Powder**

1. Glass Bottle, Solid, 67 g Assume Full

**1 bottle - Thallium Nitrate**

1. Glass Bottle, Solid, 25 g Assume Full

**5 bottles - Thorium Nitrate**

1. Glass Bottle, Solid, 113.4 g Assume Full
2. Glass Bottle, Solid, 113.4 g Assume Full
3. Glass Bottle, Solid, 113.4 g Assume Full
4. Glass Bottle, Solid, 28.3 g Assume Full
5. Glass Bottle, Solid, 113.4 g Assume Full

**1 - Radioactive Source Button – 137Cs 10 uCi**

**2 bottles – Thallium 204 (Images 3 & 4)**

1. Plastic Scintillation Vial (20ml), Liquid, 5 ml in 1M-HNO<sub>3</sub>, 10 uCi in Aug 1994. Calculated by user at 3.6 uCi on 2/29/2000. Oxford Instruments, Serial No. 195C15 (615) 483-8405
2. Plastic Scintillation Vial (20ml), Liquid, 5 ml in 1M-HNO<sub>3</sub>, 10 uCi in Oct 1989. Calculated by user at 1.5 uCi on 3/1/2000. The Nucleus, Oak Ridge, TN. (615) 483-0008 No Serial Number.

These read ~300 CPM over background on the 1x1 gamma scintillator.

**1 Bucket of Unknown Salts- (Figures 5 & 6)** Beakers, Planchets, Paper Towels, Agar plates, all encrusted with unknown salts that are radioactive. These may be uranyl salts of some kind.

1. 600 ml Pyrex beaker filled with paper towels and salt residue. Readings on contact:
  - a. Gamma – 3500 cpm
  - b. Beta – ND
  - c. Alpha – ND
2. 400 ml Pyrex beaker filled with plastic and metal planchets encrusted with salt residue. Readings on contact:
  - a. Gamma – 13,000 cpm
  - b. Beta – 1000 cpm
  - c. Alpha – ND
3. Glass Cup – about 500 ml, labeled “HCl / Salt Solution” Contains planchets and paper towel. Readings on contact:
  - a. Gamma - 3000 cpm
  - b. Beta – 445 cpm
  - c. Alpha – ND
4. One wadded up paper towel. Readings on contact:
  - a. Gamma – 4500 cpm
  - b. Beta – 3600 cpm
  - c. Alpha – ND
5. One not-so-wadded-up paper towel. Readings on contact:
  - a. Gamma - 3000 cpm
  - b. Beta – 350 cpm
  - c. Alpha – ND **\*\* (The paper towels were consolidated into one Ziploc Bag)**
6. 1-Plastic cup of planchets encrusted with salts. Readings on contact:
  - a. Gamma – 40,000 cpm
  - b. Beta – 27,000 cpm
  - c. Alpha – ND

7. Pyrex and Plastic Agar Plates encrusted with salts in a Ziploc Bag. Readings on contact:
  - a. Gamma - 90,000 cpm
  - b. Beta - 50,000 cpm
  - c. Alpha - ND

**3 - Plastic Country Time Lemonade containers (Figures 5 & 6)** - filled with what looks like soil samples. Estimated weight of each container is 1-2 lbs. Alpha was not measured because we didn't have adequate facilities to open up the containers.

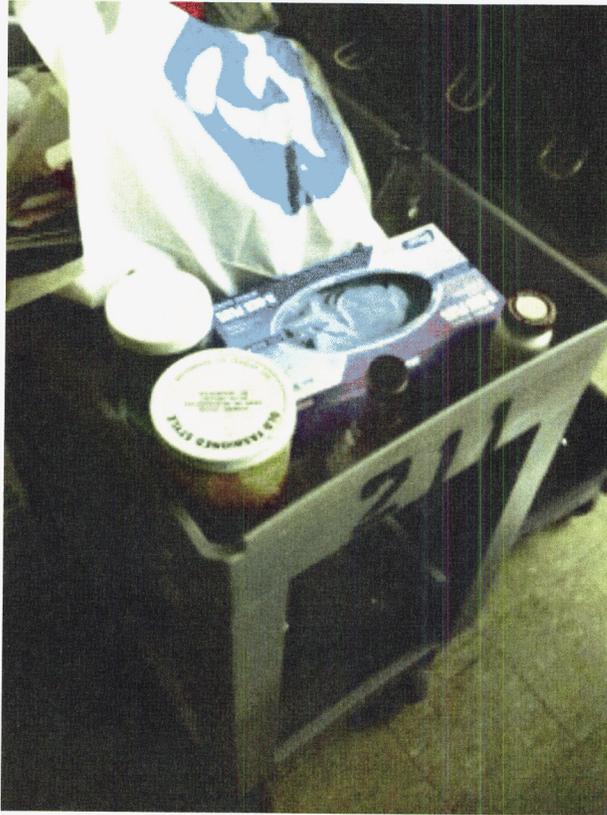
1. Readings on contact
  - a. Gamma - 4000 cpm
  - b. Beta - ND
2. Readings on contact
  - a. Gamma - 3000 cpm
  - b. Beta - ND
3. Readings on contact
  - a. Gamma - 3000 cpm
  - b. Beta - ND

**Other Items- Seen in Figures 1 & 2**

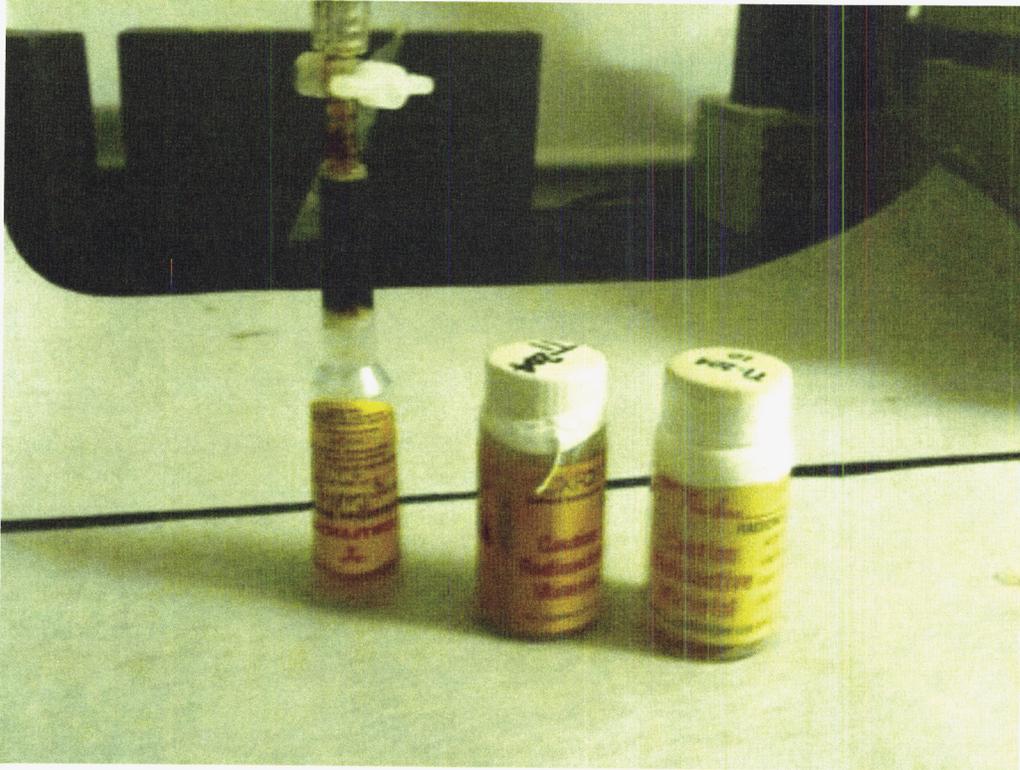
There are a number of items that were determined to be non-radioactive by a survey on the outside of the waste containers. LTU staff was advised that no samples were taken of the liquids inside of the waste containers, and as such a low energy beta and alpha assay was not performed. **Lawrence Tech will arrange for disposal with their Hazardous Waste contractor:**

- 1-empty Woolite bottle
- 2- 125 mL size (2 x 50 mL) Erlenmeyer flask containing unknown liquids
- 5-18 oz. size jars of unknown materials (4 jars contain liquids and the inside of one jar is coated with a white powder).
- 1-liter size volumetric flask containing Hydrochloric acid and saline
- 1-liter size Erlenmeyer flask containing Hydrochloric acid and saline
- 1-liter 0.1% EDTA for Yttrium 90 (LTU staff identified this as a non-radioactive EDTA solution).
- 1-500 mL plastic bottle labeled Dynamo II, containing about 50 mL of liquid
- 1 bottle - cadaverine

Figures 1 & 2



Figures 3 & 4





### Summary of actions taken

Shelf in nuclear room was cleared and items surveyed. Unknown radioactive items were assayed as listed and organized for disposal.

Shelf and floor in front of shelf were surveyed with no activity found.

Bag of hangers, books, coffee cans, and miscellaneous boxes were surveyed with no activity found.

Carol Lentz will submit the waste list to her employer (Chase Environmental) for disposal quote.