MINNESOTA MDH DEPARTMENT OF HEALTH

*Protecting, maintaining and improving the health of all Minnesotans*

February 1, 2006

Mr. William Snell
Materials Licensing Branch
United States Nuclear Regulatory Commission, Region III
2443 Warrenville Road
Lisle, Illinois 60532-4452

Dear Mr. Snell:

**Subject: License No. 22-04589-01, Amendment No. 37**

This letter is a follow-up to the email I sent you on January 26, 2006. Attached are the findings from the close-out survey of Room 703 at 717 Delaware Street Southeast, Minneapolis, Minnesota. The attachment is a supplement to the amendment application from the Public Health Laboratory Division of the Minnesota Department of Health, dated December 29, 2005, and replicates the information attached to the January 26, 2006, email.

The material attached to this letter should replace the printout of wipe results for Room 703 that was included in the materials sent to you with the original application. Because of incorrect assumptions about counting times when the wipes were analyzed, the Room 703 wipe data on the original printout is invalid.

Please feel free to contact Mr. John Lorenz, of my staff, at (651) 201-5354, or by email at john.lorenz@health.state.mn.us, if you have any questions about the survey of Room 703, or any other part of the close-out survey.

Thank you for reviewing our application.

Sincerely,

Norman A. Crouch, Ph.D.
Public Health Laboratory Division Director
Minnesota Department of Health
601 Robert Street North, P.O. Box 64899
Saint Paul, Minnesota 55164-0899

(651) 201-5063

NAC/cas
cc: Louise Liao, Environmental Laboratory Manager
John Lorenz, Radiation Safety Officer

# Minnesota Department Of Health - Environmental Laboratory

Final Report - Client Copy - Report Of Analytical Results

Program: HS
Program Name: RADIATION CONTROL

Date Received: 09-DEC-2005
Date Generated: 10-JAN-2006
Request Page: 1 of 3
Date Reported: 11-JAN-2006

Samples: 200533073 - 200533074

Collected By
TIM D.

---

Sample No: 200533073 Receiving Comments: -

| Town/Facility | Coll Date | Coll Time |
|---|---|---|
| MPLS/HENN | 07-DEC-2005 | - |

| Field No | Sampling Point |
|---|---|
| 1 | Room 703, 717 Delaware (composite 1-21 p |

********** SAMPLE RESULTS **********

Unit: RADIOCHEMISTRY Reviewed By JJB on 11-JAN-06

| | Result Codes | Result | Rept Level | Units | Analysis Date |
|---|---|---|---|---|---|
| 821 Radioactivity on Wipes by A/B | | | | | |
| Gross Alpha | | < 5.0 | 5.0 | pCi/wipe | 14-DEC-05 |
| Gross Beta | | < 5.0 | 5.0 | pCi/wipe | 14-DEC-05 |

# Minnesota Department Of Health - Environmental Laboratory

**Final Report - Client Copy - Report Of Analytical Results**

Program: **HS**
Program Name: **RADIATION CONTROL**

Date Received: **09-DEC-2005**
Date Generated: **10-JAN-2006**
Request Page: **2 of 3**

**Samples: 200533073 - 200533074**

Date Reported: **11-JAN-2006**

Collected By
**TIM D.**

---

Sample No: **200533074** Receiving Comments: -

| Town/Facility | Coll Date | Coll Time |
|---|---|---|
| - | - | - |

| Field No | Sampling Point |
|---|---|
| 2 | - |

********** SAMPLE RESULTS **********

**Unit: RADIOCHEMISTRY** Reviewed By **JJB** on **11-JAN-06**

800 Gamma Analysis 13-DEC-05 09:21

| | Time of Count Activity | | Time Corrected Activity | Counting Uncertainty | Units |
|---|---|---|---|---|---|
| Americium-241 | < | 1.84E+01 | 1.84E+01 | | pCi/wipes |
| Barium-133 | < | 1.04E+01 | 1.04E+01 | | pCi/wipes |
| Barium-140 | < | 2.96E+01 | 3.91E+01 | | pCi/wipes |
| Beryllium-7 | < | 6.00E+01 | 6.42E+01 | | pCi/wipes |
| Bismuth-212 | < | 1.43E+02 | 1.44E+02 | | pCi/wipes |
| Bismuth-214 | < | 2.66E+01 | 2.66E+01 | | pCi/wipes |
| Cerium-141 | < | 1.06E+01 | 1.18E+01 | | pCi/wipes |
| Cerium-144 | < | 3.75E+01 | 3.80E+01 | | pCi/wipes |
| Cobalt-57 | < | 6.85E+00 | 6.94E+00 | | pCi/wipes |
| Cobalt-58 | < | 1.21E+01 | 1.28E+01 | | pCi/wipes |
| Cobalt-60 | < | 1.26E+01 | 1.27E+01 | | pCi/wipes |
| Chromium-51 | < | 5.79E+01 | 6.58E+01 | | pCi/wipes |
| Cesium-134 | < | 6.06E+00 | 6.09E+00 | | pCi/wipes |
| Cesium-137 | < | 9.43E+00 | 9.43E+00 | | pCi/wipes |
| Iron-59 | < | 1.26E+01 | 1.37E+01 | | pCi/wipes |
| Iodine-131 | < | 9.03E+00 | 1.41E+01 | | pCi/wipes |
| Iodine-132 | < | 8.13E+00 | >12 HALFLIVES | | pCi/wipes |
| Iodine-133 | < | 8.75E+00 | 5.28E+02 | | pCi/wipes |
| Iodine-134 | < | 1.03E+01 | >12 HALFLIVES | | pCi/wipes |
| Iodine-135 | < | 3.15E+01 | >12 HALFLIVES | | pCi/wipes |
| Potassium-40 | < | 2.29E+02 | 2.29E+02 | | pCi/wipes |
| Krypton-88 | < | 1.46E+01 | >12 HALFLIVES | | pCi/wipes |
| Manganese-54 | < | 9.12E+00 | 9.23E+00 | | pCi/wipes |
| Niobium-95 | < | 8.87E+00 | 9.82E+00 | | pCi/wipes |
| Lead-210 | < | 3.79E+02 | 3.79E+02 | | pCi/wipes |
| Lead-212 | < | 1.71E+01 | 1.71E+01 | | pCi/wipes |

# Minnesota Department Of Health - Environmental Laboratory

Final Report - Client Copy - Report Of Analytical Results

Program: HS
Program Name: RADIATION CONTROL

Date Received: 09-DEC-2005
Date Generated: 10-JAN-2006
Request Page: 3 of 3

Samples: 200533073 - 200533074

Date Reported: 11-JAN-2006

Collected By
TIM D.

---

Sample No: 200533074 Receiving Comments: -

| Town/Facility | Coll Date | Coll Time |
|---|---|---|
| - | - | - |

Field No: 2
Sampling Point: -

********** SAMPLE RESULTS **********

Unit: RADIOCHEMISTRY Reviewed By JJB on 11-JAN-06

800 Gamma Analysis (Cont.) 13-DEC-05 09:21

| | Time of Count Activity | Time Corrected Activity | Counting Uncertainty | Units |
|---|---|---|---|---|
| Lead-214 | < 2.57E+01 | 2.57E+01 | | pCi/wipes |
| Radium-224 | < 1.65E+02 | 1.66E+02 | | pCi/wipes |
| Radium-226 | < 1.83E+02 | 1.83E+02 | | pCi/wipes |
| Ruthenium-103 | < 7.80E+00 | 8.53E+00 | | pCi/wipes |
| Ruthenium-106/Rhodium-106 | < 5.55E+01 | 5.60E+01 | | pCi/wipes |
| Strontium-91 | < 3.10E+01 | >12 HALFLIVES | | pCi/wipes |
| Tellurium-132 | < 6.08E+00 | 1.81E+01 | | pCi/wipes |
| Thorium-228 | < 5.38E+02 | 5.39E+02 | | pCi/wipes |
| Thorium-230 | < 1.88E+03 | 1.88E+03 | | pCi/wipes |
| Thallium-208 | < 3.13E+01 | 3.14E+01 | | pCi/wipes |
| Xenon-133 | < 1.61E+01 | 3.18E+01 | | pCi/wipes |
| Xenon-135 | < 4.24E+00 | >12 HALFLIVES | | pCi/wipes |
| Zinc-65 | < 1.91E+01 | 1.94E+01 | | pCi/wipes |
| Zirconium-95 | < 1.57E+01 | 1.66E+01 | | pCi/wipes |

# Close-Out Survey
## Room 703
### 717 Delaware Street Southeast
### Minneapolis, MN

**Radionuclides and Location of Use**

Room 703 (roof penthouse)

This room was mainly used as a laboratory to analyze (count) air samples for radioactivity and read environmental thermoluminescent dosimeters. The samples and TLDs were part of the EPA RadNet (formerly ERAMS) program. Sr-90 (EPA blue disk) was used to check calibrate a GM meter before reading air filters. This disk activity is about 0.04 microcurie (exempt); it was moved to the new building.

Prior to 1997, a 10 mCi Cs-137 source was used to check calibrate survey instruments. This source never leaked, and was sent to Brebig Co. in Germany for disposal/re-use. The source was placed into the shipping container and shipped on July 24, 1997.

The room was also used to store exempt C-14 and Cs-137 check source buttons. These buttons were never damaged and were moved to the new building.

After skin absorption studies were completed in 1990, C-14 chlorobenzene (150 microcurie) was stored there. This was disposed through Philotechnics, Oak Ridge, Tennessee on April 11, 2001.

The room was also used to store a solution of Ra-226 chloride (20 microcurie), which was taken from an estate. This was disposed in the drain of the floor sink on January 27, 1993.

**Method and results**

Room 703 (roof penthouse)

On December 7, 2005, 21 dry wipes were taken on surfaces likely to be contaminated (for example, door and drawer handles, faucets, light switches, etc.). Three wipes showed detectable levels of alpha emitters. The highest was 7.19 dpm on the wipe from the floor sink drain cover. Lower activities (1.09, 0.82) were found on wipes from the floor sink faucet and side wall, respectively. The alpha emitter of primary concern for the room is Ra-226. All results are less than the guideline level of 3.15E+02 dpm/100cm$^2$ for Ra-226 in equilibrium with its decay products.

Detectable beta activity was found on four wipes. The highest beta activity (4.75 dpm) was also found on the wipe from the floor sink drain cover. Wipes from floor sink side wall, end of an equipment table and the inside door handle had activities of 0.80, 0.71 and 0.71 dpm respectively. The results do not challenge the guidelines for any beta emitting radionuclides.

The 21 wipes were composited and showed no gamma radiation above background.

History of room 703

On November 5, 2002, a GM survey of the room was made to determine if it could be released for unrestricted use. This survey found radiation emanating from the drain in the floor sink. Net CPM was measured at 700, using an SE International Inspector GM, (thin mica window, 1.4 mg per square cm). The drain cover was not contaminated, radiation was coming from inside the drain walls. A sample taken inside the drain showed radium-226 daughters, indicating the contamination may have come from the disposal of the estate radium in 1993.

Monthly washings of the drain with Lime-a-Way were initiated in January of 2003, and continued until November of 2005. By the end of 2003, net CPM remaining measured with the Inspector was about 26. By the end of 2004, net CPM was about 4. By December 7, 2005, net CPM was 0.

On December 7, 2005 a survey of the entire room with a GM counter equipped with a pancake probe, found no positive net CPM. Areas surveyed included the floor, counter tops, windowsills, inside of drawers and cabinets, door, and vertical walls up to seven feet (the ceiling was not surveyed).

**Conclusions**

All radioactive materials in Room 703 have been removed, no contamination above NRC guidelines remains; the room can be released for unrestricted use.

**Appendix A results**

See attached MS Excel spreadsheet with alpha/beta results and .pdf file containing report of gamma analysis.

**Appendix B instrument spec.**

The Victoreen Model 190 Geiger-Mueller survey meter and RP-1 pancake probe were used to form a high-efficiency detector capable of scanning for alpha, beta, and gamma, radiation. This unit is commonly used for geological and environmental surveys, but is also ideal for use by emergency response teams or in any place where radioactive contamination is suspected.

Detects alpha radiation above 3.5 MeV, beta above 3.5 keV, and gamma above 6 keV; has a thin mica window over the halogen-quenched Geiger-Mueller tube. Capable of rapid scanning of flat surfaces such as floors and tabletops.

Sensitivity: 3500 CPM/mR/hr.

Typical background: 30 CPM

# Radiation Wipe Sample Results

**Minnesota Dept. Health**
**Public Health Laboratory**
**717 Delaware St. S.E., Mpls. MN**

| Minimum Detectable Activity | | |
|---|---|---|
| α/β Counter | L.S.C. | Gamma |
| α= 0.41 dpm | β= 33.6 dpm | Cs-137= 9.4 dpm |
| β= 0.67 dpm | | Co-60= 12.6 dpm |
| | | Bi-214= 26.6 dpm |
| | | Ra-226= 183.0 dpm |

**Room 703 -- Results for wipe samples**

| Location | α/βSample No. | Date Coll. | α Results (dpm) | β Results (dpm) | LSCγ Samp. No. | LSC Results (dpm) | γ Results (dpm) |
|---|---|---|---|---|---|---|---|
| 703-1 | 200533053 | 12/7/2005 | 7.19 | 4.75 | | | |
| 703-2 | 200533054 | 12/7/2005 | 1.09 | <MDA | | | |
| 703-3 | 200533055 | 12/7/2005 | 0.82 | 0.8 | | | |
| 703-4 | 200533056 | 12/7/2005 | <MDA | <MDA | | | |
| 703-5 | 200533057 | 12/7/2005 | <MDA | <MDA | | | |
| 703-6 | 200533058 | 12/7/2005 | <MDA | <MDA | | | |
| 703-7 | 200533059 | 12/7/2005 | <MDA | <MDA | | | |
| 703-8 | 200533060 | 12/7/2005 | <MDA | <MDA | | | |
| 703-9 | 200533061 | 12/7/2005 | <MDA | <MDA | | | |
| 703-10 | 200533062 | 12/7/2005 | <MDA | <MDA | | | |
| 703-11 | 200533063 | 12/7/2005 | <MDA | <MDA | | | |
| 703-12 | 200533064 | 12/7/2005 | <MDA | <MDA | | | |
| 703-13 | 200533065 | 12/7/2005 | <MDA | <MDA | | | |
| 703-14 | 200533066 | 12/7/2005 | <MDA | <MDA | | | |
| 703-15 | 200533067 | 12/7/2005 | <MDA | <MDA | | | |
| 703-16 | 200533068 | 12/7/2005 | <MDA | <MDA | | | |
| 703-17 | 200533069 | 12/7/2005 | <MDA | <MDA | | | |
| 703-18 | 200533070 | 12/7/2005 | <MDA | <MDA | | | |

| Room 703 -- Results for wipe samples | | | | | | | |
|---|---|---|---|---|---|---|---|
| Location | α/βSample No. | Date Coll. | α Results (dpm) | β Results (dpm) | LSC/γ Samp. No. | LSC Results (dpm) | γ Results (dpm) |
| 703-19 | 200533071 | 12/7/2005 | <MDA | 0.71 | | | |
| 703-20 | 200533072 | 12/7/2005 | <MDA | <MDA | | | |
| 703-21 | 200533073 | 12/7/2005 | <MDA | 0.71 | | | |
| 1-21 Composite | | 12/7/2005 | | | 200533074 | N/A | <MDA |

**Appendix C cals and checks**

The Victoreen Model 190 GM meter was calibrated on August 2, 2005 by the Iowa Radiological Maintenance Shop, Johnston, Iowa. The instrument has a built-in check source, which is used prior to each use.