STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

REBECCA A. HUMPHRIES
DIRECTOR

September 8, 2010

Ms. Patricia J. Pelke, Chief
Materials Licensing Branch
U.S. Nuclear Regulatory Commission, Region III
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Dear Ms. Pelke:

SUBJECT: NRC License Number: 21-05199-02

We are requesting an amendment to our license. We are also requesting an expedited review for this amendment.

Two copies of this letter, NRC Form-313, and all attachments are enclosed.

If you have any questions, please contact me via telephone; skowronekr@michigan.gov; or DNRE, P.O. Box 30241, Lansing, Michigan 48909-77411.

Sincerely,

Robert D. Skowronek, Chief
Radioactive Materials Unit
Radiological Protection Section
Environmental Resource Management Division
517-241-1253

RDS:JK
Enclosures

| NRC FORM 313 (3-2009) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40 | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED BY OMB: NO. 3150-0120 | EXPIRES: 3/31/2012 |
|---|---|---|---|

# APPLICATION FOR MATERIALS LICENSE

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

**INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.**

**APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:**

OFFICE OF FEDERAL & STATE MATERIALS AND
ENVIRONMENTAL MANAGEMENT PROGRAMS
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

**ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:**

**IF YOU ARE LOCATED IN:**

**ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:**

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

**IF YOU ARE LOCATED IN:**

**ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:**

MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

**ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:**

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
612 E. LAMAR BOULEVARD, SUITE 400
ARLINGTON, TX 76011-4125

**PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.**

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*
   - ☐ A. NEW LICENSE
   - ☑ B. AMENDMENT TO LICENSE NUMBER 21-05199-02
   - ☐ C. RENEWAL OF LICENSE NUMBER

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include ZIP code)*
   State of Michigan
   Department of Natural Resources & Environment
   Env Resource Mngmt Div/Radiological Protection Sect
   PO Box 30241
   Lansing, Michigan 48909-7741

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED
   815 Filley Street
   Lansing, Michigan

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION
   Robert D. Skowronek

   TELEPHONE NUMBER
   (517) 241-1253

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
   a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSE FEES *(See 10 CFR 170 and Section 170.31)*
    FEE CATEGORY 8A | AMOUNT ENCLOSED $ 0.00

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39, AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

| CERTIFYING OFFICER – TYPED/PRINTED NAME AND TITLE | SIGNATURE | DATE |
|---|---|---|
| Robert D. Skowronek, Chief, Rad Materials Unit | Robert D Skowronek | 9/8/10 |

## FOR NRC USE ONLY

| TYPE OF FEE | FEE LOG | FEE CATEGORY | AMOUNT RECEIVED | CHECK NUMBER | COMMENTS |
|---|---|---|---|---|---|
| | | | $ | | |
| APPROVED BY | | | | DATE | |

Attachment to Application for Material License 21-05199-02

1. Amend Material License 21-05199-02 as follows:

   A. Modify Licensee Name to:

      State of Michigan
      Department of Natural Resources and Environment
      Environmental Resource Management Division
      Radiological Protection Section
      PO Box 30241
      Lansing, Michigan 48909-7741

   B. Amend Condition 10 to read:

      Licensed material shall be used at the licensee's facility located at 815 Filley Street, Lansing, Michigan. Licensed material listed in Subitems 6.F. and 6.G. may be used at temporary jobsites throughout the state of Michigan.

   C. Condition 11

      Remove Robert L. DeHaan as an Authorized User.
      Add Matt Bowen as an Authorized User for "All" materials.

2. Education and Experience for Matt Bowen

   Education: Eastern Michigan University, B.A. in physics 2002
   Michigan State University, M.S. in physics 2006

   Experience: In October 2007, began working for the state of Michigan as a planner for emergency response for a nuclear power plant disaster, began assisting in the calibration of radiation detection instruments, and received related on-the-job training. Between October 2007 and the present, Mr. Bowen has been deployed overseas for 18 months with the Michigan Army National Guard.

3. The Final Status Survey for 815 Terminal Road is attached.

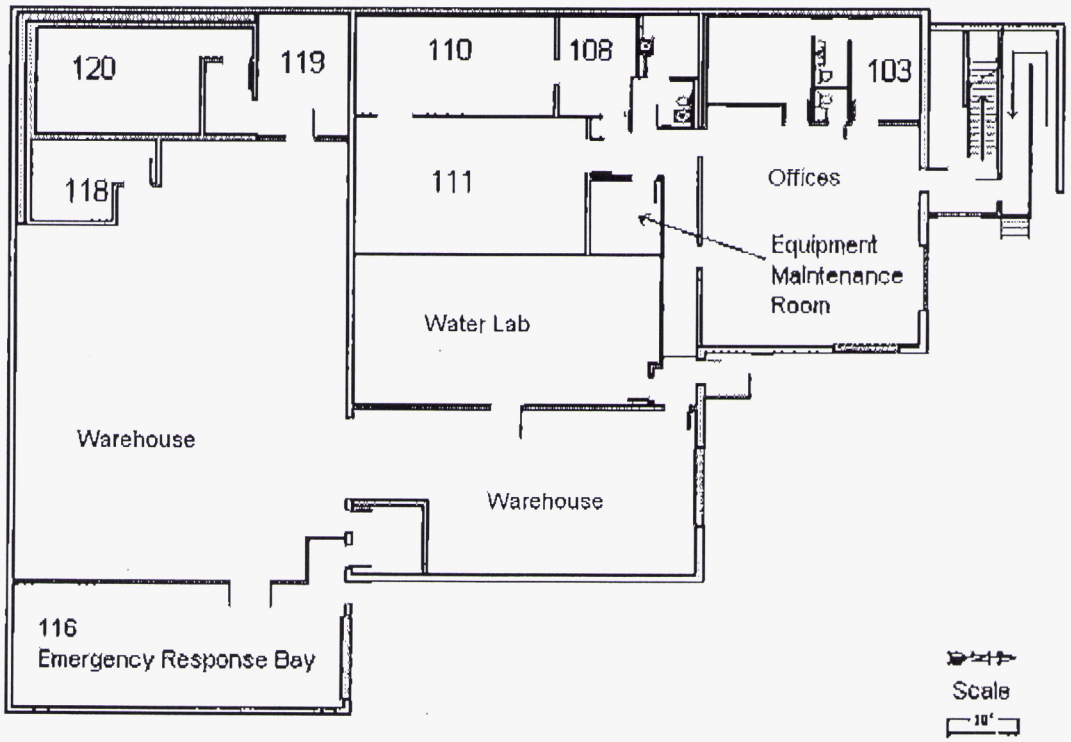
Final Status Survey
NRC License Number 21-05199-02
815 Terminal Road, Lansing, Michigan

Historical Site Assessment

The U.S. Nuclear Regulatory Commission (NRC) license number 21-05199-02 authorizes the state of Michigan to use radioactive material at 815 Terminal Road and at 815 Filley Street in Lansing, Michigan. The NRC license authorizes sealed sources for instrument calibration and training and sealed and unsealed radioactive material in calibration standards, environmental samples, and incident response samples.

From 2000 until 2010, the Radiological Protection Section operated a calibration room, a survey instrument repair room, a radioactive material storage room, the Nuclear Counting Facility consisting of a wet lab and a radiological counting room, and associated office space at Terminal Road. The building also contained rooms unassociated with the radiological program including a large warehouse area and a water laboratory.

The calibration room (Room 120) contained a sealed radioactive source that was used to calibrate portable gamma radiation survey meters. Exempt activity plated sources were used on the countertop in the survey instrument repair room (Room 119) to calibrate alpha and beta radiation survey equipment. Environmental samples, radioactive items recovered from the public domain, sealed calibration sources, plated disk sources, and laboratory standards were stored in the radioactive materials storage room (Room 118). The wet lab (Room 111) and counting facility (Room 110) processed and counted environmental samples and source wipes.




815 Terminal Road, Lansing, Michigan

In July 2010, all radioactive sources and other equipment were moved from 815 Terminal Road to 815 Filley Street. After all the sources and equipment were moved out and the rooms were empty, a final status radiation survey was performed in the rooms that contained radioactive material. The survey included a gamma radiation survey of the rooms to verify all gamma radiation sources had been removed, alpha and beta surveys of the walls, floor, ceilings, hoods, drawers, and countertops to verify that no residual radioactive material remained, and wipe tests of these areas to further confirm that no residual radioactive material remained at the site.

NUREG-1757, "Consolidated Decommissioning Guidance" was used to determine the appropriate decommissioning group for each room and to guide the final status survey for that room.

On September 1, 2010, Mr. Geoffrey Warren from the U.S. Nuclear Regulatory Commission Region III office visited the 815 Terminal Road site and viewed the empty calibration room, survey instrument repair room, radioactive material storage room, and Nuclear Counting Facility.

## Calibration Room

The only radioactive source used in this room was a J.L. Shepherd Model 28-6a calibrator containing a sealed cesium-137 source with a current activity of 460 millicuries. Leak tests of this device have been performed at 6-month intervals and no positive results were received for this device. A copy of the most recent leak test result is attached. The Calibration Room meets the criteria for decommissioning Group 1 in NUREG-1757.

The J.L. Shepherd Model 28-6a calibrator was moved to 815 Filley Street in Lansing, Michigan. On July 27, 2010, Mr. Matt Bowen of our staff surveyed the empty Calibration Room with an Eberline PRM-7 microroentgen per hour (μR/h) meter (SN 213 calibrated April 28, 2010) at a distance of one meter from the floors and walls. No gamma readings exceeded the background radiation reading of 10 μR/h. The survey confirmed the sealed source had been removed.

### Summary

Since the sealed radioactive source has been removed from the room and leak tests have not showed the source to be leaking, the calibration room appears to meet the criteria in NUREG-1757 for unrestricted release.

## Survey Instrument Repair Room

Plated disk sources were used on the countertop of the survey instrument repair room to calibrate alpha and beta radiation survey equipment. When not in use, the plated sources were stored in the radioactive material storage room. The highest activity americium-241 alpha source used is 0.054 microcuries and the highest activity technetium-99 beta source used is 0.021 microcuries. Since the Am-241 source is less than 10 microcuries and the Tc-99 source is less than 100 microcuries, they are not leak tested. Visual examination of all the Am-241 and Tc-99 sources show that they appear intact without any flaking or degradation of the plated disk surface. Exempt quantity cesium-137 check sources were also used on the countertop. The Survey Instrument Repair Room meets the criteria for decommissioning Group 1 in NUREG-1757.

All radioactive sources and other equipment were moved to 815 Filley Street from the Survey Instrument Repair Room. On July 23, 2010, Mr. Robert Skowronek surveyed the countertop using an Eberline E600 with a SHP360 beta/gamma "pancake" probe (SN 879 calibrated January 7, 2010) and a SHP380A alpha probe (SN 265 calibrated April 30, 2010). The background for the beta/gamma probe was 42 counts per minute and the background for the alpha probe was 10 counts per minute. The audible signal was activated to aid in finding elevated areas of contamination. No readings above background were found. A wipe test was performed on the countertop on July 28, 2010 and counted by our NCF. The results were 0.6 ± 0.3 picocuries gross alpha and <0.5 picocuries gross beta.

On July 27, 2010, Mr. Matt Bowen of our staff surveyed the empty Survey Instrument Repair Room with an Eberline PRM-7 µR/h meter (SN 213 calibrated April 28, 2010) at a distance of one meter from the floors and walls. The gamma radiation readings from the interior walls and floor did not exceed the background radiation reading of 10 µR/h. The west wall on which the cupboards are hung and the north wall are load-bearing walls composed of concrete or cinder blocks. The gamma radiation readings in contact with these walls were 12 µR/h. The gamma radiation reading outside the building in contact with the west wall was also 12 µR/h. We conclude that the slightly elevated radiation readings in contact with these walls is due to natural radioactive material in the blocks comprising the walls.

Summary

Since the radioactive sources has been removed from the room and no contamination was found during a radiation survey of the countertop, the Survey Instrument Repair Room appears to meet the criteria in NUREG-1757 for unrestricted release.

## Nuclear Counting Facility

The Nuclear Counting Facility (NCF) is responsible for counting environmental samples collected as part of Michigan's nuclear power plant monitoring program. Additional "special samples," collected in support of radioactive materials incident investigations, were also counted at the NCF. Other sources at the NCF were sealed laboratory calibration standards and check sources. Radioactive samples were not stored at the NCF after laboratory analysis.

The environmental samples were milk, water, and air samples collected around Michigan's nuclear power plants and samples of technologically enhanced naturally occurring radioactive material primarily from oil and gas production facilities and water treatment plants. In addition, some special samples were identified as containing uranium, thorium, cobalt-60, and/or cesium-137. One wipe from an Am/Be source discovered at a scrap yard showed 60 picocuries americium-241. During operation, the NCF was kept radiologically clean so as to not cross-contaminate samples. Based on the above information, the facility was determined to require a Group 2 decommissioning process.

After all radioactive sources and other equipment were moved to 815 Filley Street, a Final Status Survey was conducted at the NCF.

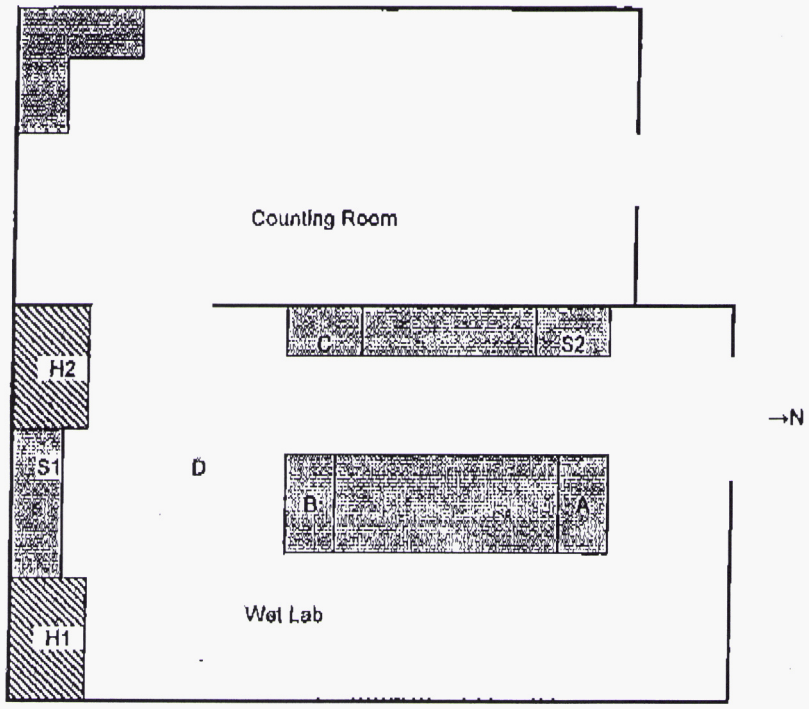
Surface Contamination Limits

Attachment 1 shows the methodology used to determine the surface contamination limits for radionuclides counted at the NCF.

The most restrictive limit for alpha contamination from alpha emitters is the 125 cpm/100 $cm^2$ calculated for americium-241. However, in the 10 years of operation of the NCF, the only Am-241 received at the NCF was one wipe with an activity of 30 picocuries. Given the unlikely possibility of appreciable contamination from that one wipe, we will use the radionuclide with the next lowest surface contamination limit which is natural thorium in equilibrium with its progeny. Since the alpha probe detection area is 100 $cm^2$, any alpha reading over 165 cpm could indicate that the dose constraints are exceeded.

The most restrictive limit for beta/gamma contamination is the 990 cpm/100 $cm^2$ calculated for cobalt-60. Since the beta/gamma probe detection area is 15 $cm^2$, the limit must be reduced by a factor of 15/100. Therefore, any beta/gamma reading over 148 cpm could indicate that the dose constraints are exceeded.

NCF Surveys




If the lab became contaminated, it would likely have occurred during sample preparation in the Wet Lab. Preparation for analysis of non-liquid samples was performed on trays covered with absorbent paper. Areas in the wet lab most likely to become contaminated would have included the sample receipt area (area A), the sample preparation areas (areas B and C), the fume hoods (H1 and H2), sinks (S1 and S2), floor drain (D), and floor areas immediately beneath these work areas. In the Counting Room, the countertop and a drawer in the cabinet beneath the countertop that stored the sealed quality assurance sources would be the most likely areas of contamination.

On July 27, 2010, Mr. Robert Skowronek of our staff surveyed the empty NCF with an Eberline PRM-7 µR/h meter (SN 213 calibrated April 28, 2010) at a distance of one meter from the floors and walls. The gamma radiation readings from the walls and floor did not exceed the background radiation reading of 10 µR/h.

On July 27, 2010, Mr. Matt Bowen and Mr. Robert Skowronek surveyed all countertops, hoods, the drawer in the counting room that stored sources, the sinks, and the floor areas immediately in front of these areas with a beta/gamma probe and an alpha probe. The audible signal was activated to aid in finding elevated areas of contamination. No readings above background were found. The instruments used were an Eberline E600 with a SHP360 beta/gamma "pancake" probe (SN 879 calibrated January 7, 2010), a SHP360 probe (SN 342 calibrated January 6, 2010, and a SHP380A alpha probe (SN 265 calibrated April 30, 2010). Background measurements for the SHP380 SN879 probe was 42 cpm, the SHP380 SN342 probe was 41 cpm, and the alpha probe was 10 cpm.

Static measurements and surface wipes of 100 square centimeters were taken in selected locations. Wipes were counted by the NCF (Oxford/Canberra Tennelec Series 5). The E600 has an "integrate" mode that can be used to total the number of counts in a given length of time. Static measurements were counts in 60 seconds.

| Location | Static β/γ SN879 | Static β/γ SN342 | Static α SN265 | Wipe Gross α (pCi) | Wipe Gross β (pCi) |
|---|---|---|---|---|---|
| Sink 1 | | | | LT 0.3 | LT 0.5 |
| Sink 1 over drain | 40 | | | | |
| Trap under sink 1 | 39 | | | | |
| Sink 2 | | | | LT 0.3 | LT 0.5 |
| Sink 2 over drain | 35 | | | | |
| Trap under sink 2 | 30 | | | | |
| Countertop Area A | | 43 | 8 | 0.9 ± 0.4 | LT 0.5 |
| Countertop Area B | | 42 | | LT 0.3 | LT 0.5 |
| Countertop Area C | | 37 | 4 | LT 0.3 | LT 0.5 |
| Floor below Area A | | 43 | | LT 0.3 | LT 0.5 |
| Floor below Area B | | | | LT 0.3 | LT 0.5 |
| Floor below Area C | | | | 1.0 ± 0.5 | LT 0.5 |
| Floor Drain | | 35 | 8 | LT 0.3 | LT 0.5 |
| Hood 1 | | 31 | | LT 0.3 | LT 0.5 |
| Hood 2 | | 41 | | LT 0.3 | LT 0.5 |
| Elephant exhaust device | | 36 | | 0.3 ± 0.3 | LT 0.5 |
| Door handle on N end of Wet Lab | 42 | | | LT 0.3 | LT 0.5 |
| Counting Lab countertop | 37 | | 10 | LT 0.3 | LT 0.5 |
| Check source drawer | 45 | | 5 | LT 0.3 | LT 0.5 |
| Floor below counting lab countertop | 43 | | 5 | LT 0.3 | LT 0.5 |

Summary

No radioactive sources were left at the site. Scanning and static radiation measurements were near background levels. The alpha results did not exceed 165 cpm per 100 $cm^2$ above background. The beta/gamma results did not exceed 140 cpm above background that would indicate excessive contamination when using the SHP360 probe with a surface area of 15 $cm^2$. The maximum gross alpha wipe test was 1.0 picocurie which is less than 10% of any of the residual contamination limits calculated using the DandD code. Based on these results, the NCF appears to meet the criteria in NUREG-1757 for unrestricted release.

## Radioactive Material Storage Room

Environmental samples, radioactive items recovered from the public domain, sealed calibration sources, plated disk sources, and laboratory standards were stored in the Radioactive Materials Storage Room (RMSR). Sealed calibration sources include cesium-137, cobalt-60, and cesium-137/americium-241. Other sources that have been stored in the room have included aircraft instruments containing radium-226 and smoke detector sources containing radium-226 or americium-241. Environmental samples containing one or more of the following long-lived radionuclides have been stored in the room: cobalt-60, cesium-137, radium-226, radium-228, uranium, and thorium. Uranium and thorium ores, metals, and compounds have also been stored in the room. Historically, all the wipe tests performed on the sealed sources resulted in gross beta analyzes less than $5 \times 10^{-5}$ µCi/wipe and the wipe tests performed on the americium-241 source resulted in gross alpha analyzes less than $0.3 \times 10^{-5}$ µCi/wipe. A copy of the most recent leak test result is attached. The most likely source of contamination in the room is radon emanations and plateout from radium characterized as technologically enhanced naturally occurring radioactive material from environmental samples collected from oil and gas sites. Based on the above information, the calibration room was determined to require a Group 2 final status survey.

After all radioactive sources and other equipment were moved to 815 Filley Street, a Final Status Survey was conducted at the RMSR.

### Surface Contamination Limits

Attachment 1 shows the methodology used to determine the surface contamination limits for radionuclides counted at the RMSR.

The most restrictive limit for alpha contamination from alpha emitters is the 125 cpm/100 $cm^2$ calculated for americium-241. Since the alpha probe detection area is 100 $cm^2$, any alpha reading over 125 cpm could indicate that the dose constraints are exceeded.

The most restrictive limit for beta/gamma contamination is the 990 cpm/100 $cm^2$ calculated for cobalt-60. Since the beta/gamma probe detection area is 15 $cm^2$, the limit must be reduced by a factor of 15/100. Therefore, any beta/gamma reading over 148 cpm could indicate that the dose constraints are exceeded.

### Gamma Radiation Survey

On July 27, 2010, Mr. Matt Bowen of our staff surveyed the empty RMSR with an Eberline PRM-7 µR/h meter (SN 213 calibrated April 28, 2010) at a distance of one meter from the floors and walls. The gamma radiation readings from the walls and floor did not exceed the background radiation reading of 10 µR/h.

### Area Surveys - Floor and Walls to 2 Meters

The floor and lower 2 meters of wall were divided into one-square-meter grids. The floor was divided into 19 grids and the walls were divided into 35 grids. The wall grid started at the room door and ran counterclockwise around the room with grids 19 through 35 in the upper tier and grids 36 through 53 in the lower tier.

On July 27 and 28, 2010, Kenneth Coble, Matt Bowen, Dan Glencer, and Ken Yale surveyed the floor and walls in the RMSR using Eberline E-600s with SHP360 beta/gamma "pancake" probes (calibrated January 6 or 7, 2010) and SHP380A alpha probes (calibrated on January 7 or April 30, 2010). The audible signal was activated to aid in finding elevated areas of contamination. The background count rates were 50 cpm beta/gamma and 5 cpm alpha. No reading above twice background were noted.

Static measurements were made in each grid with a count time of 5 minutes for alpha measurements and 30 minutes for β/γ measurements. Surface wipes of 100 square centimeters were taken in each grid. Wipes were counted by the NCF (Oxford/Canberra Tennelec Series 5).

Survey results are shown in the following table. Count rate is counts divided by the count time. Net count rate is the count rate minus the background count rate of 50 cpm beta/gamma or 5 cpm alpha.

| | SHP380A – Alpha | | | SHP360 – Beta/Gamma | | | Wipe Results | |
|---|---|---|---|---|---|---|---|---|
| Grid | Counts (5 min) | Count Rate (cpm) | Net Count Rate (cpm) | Counts (30 min) | Count Rate (cpm) | Net Count Rate (cpm) | Gross Alpha (pCi) | Gross Beta (pCi) |
| 01 | 18 | 3.6 | 0 | 1,580 | 53 | 3 | 1.7 ± 0.5 | < 0.5 |
| 02 | 14 | 2.8 | 0 | 1,711 | 57 | 7 | < 0.2 | < 0.5 |
| 03 | 19 | 3.8 | 0 | 1,642 | 55 | 5 | 0.3 ± 0.3 | < 0.5 |
| 4A | 31 | 6.2 | 1.2 | 1,544 | 51 | 1 | < 0.2 | < 0.5 |
| 4B | 18 | 3.6 | 0 | 1,608 | 54 | 4 | < 0.2 | < 0.5 |
| 05 | 20 | 4.0 | 0 | 1,555 | 52 | 2 | 0.9 ± 0.4 | < 0.5 |
| 06 | 13 | 2.6 | 0 | 1,580 | 53 | 3 | 0.6 ± 0.3 | < 0.5 |
| 07 | 14 | 2.8 | 0 | 1,477 | 49 | 0 | < 0.2 | < 0.5 |
| 08 | 20 | 4.0 | 0 | 1,659 | 55 | 5 | 0.6 ± 0.3 | < 0.5 |
| 09 | 11 | 2.2 | 0 | 1,540 | 51 | 1 | < 0.2 | < 0.5 |
| 10 | 17 | 3.4 | 0 | 1,696 | 57 | 7 | < 0.2 | < 0.5 |
| 11 | 13 | 2.6 | 0 | 1,678 | 56 | 6 | < 0.2 | < 0.5 |
| 12 | 12 | 2.4 | 0 | 1,587 | 53 | 3 | < 0.2 | < 0.5 |
| 13 | 7 | 1.4 | 0 | 1,739 | 58 | 8 | < 0.2 | < 0.5 |
| 14 | 14 | 2.8 | 0 | 1,574 | 52 | 2 | < 0.2 | < 0.5 |
| 15 | 18 | 3.6 | 0 | 1,658 | 55 | 5 | 0.5 ± 0.3 | < 0.5 |
| 16 | 22 | 4.4 | 0 | 1,750 | 58 | 8 | < 0.2 | < 0.5 |
| 17 | 17 | 3.4 | 0 | 1,574 | 52 | 2 | < 0.2 | 0.5 ± 0.5 |
| 18 | 15 | 3.0 | 0 | 1,039 | 35 | 0 | < 0.2 | 0.6 ± 0.5 |
| 19 | 9 | 1.8 | 0 | 1,492 | 50 | 0 | 0.5 ± 0.3 | < 0.5 |
| 20 | 15 | 3.0 | 0 | 1,512 | 50 | 0 | 0.7 ± 0.4 | 0.6 ±0.5 |
| 21 | 11 | 2.2 | 0 | 1,414 | 47 | 0 | 0.3 ± 0.3 | < 0.5 |
| 22 | 9 | 1.8 | 0 | 1,465 | 49 | 0 | 0.8 ± 0.4 | 0.6 ± 0.5 |
| 23 | 7 | 1.4 | 0 | 1,587 | 53 | 3 | < 0.2 | 0.6 ± 0.5 |
| 24 | 10 | 2.0 | 0 | 1,669 | 56 | 6 | 0.9 ± 0.4 | 0.7 ± 0.5 |
| 25 | 15 | 3.0 | 0 | 1,354 | 45 | 0 | 0.8 ± 0.4 | 1.6 ± 0.6 |
| 26 | 7 | 1.4 | 0 | 1,402 | 47 | 0 | 0.6 ± 0.3 | 1.4 ± 0.6 |
| 27 | 20 | 4.0 | 0 | 1,519 | 51 | 1 | 0.9 ± 0.4 | 1.6 ± 0.6 |
| 28 | 9 | 1.8 | 0 | 1,484 | 49 | 0 | 0.5 ± 0.3 | 0.8 ± 0.5 |
| 29 | 13 | 2.6 | 0 | 1,386 | 46 | 0 | 0.3 ± 0.3 | < 0.5 |
| 30 | 21 | 4.2 | 0 | 1,440 | 48 | 0 | 0.4 ± 0.3 | 0.8 ± 0.5 |
| 31 | 17 | 3.4 | 0 | 1,478 | 49 | 0 | 0.6 ± 0.3 | < 0.5 |
| 32 | 6 | 1.2 | 0 | 1,557 | 52 | 2 | 0.4 ± 0.3 | 0.9 ± 0.5 |

| Grid | SHP380A – Alpha | | | SHP360 – Beta/Gamma | | | Wipe Results | |
|---|---|---|---|---|---|---|---|---|
| | Counts (5 min) | Count Rate (cpm) | Net Count Rate (cpm) | Counts (30 min) | Count Rate (cpm) | Net Count Rate (cpm) | Gross Alpha (pCi) | Gross Beta (pCi) |
| 33 | 14 | 2.8 | 0 | 1,370 | 46 | 0 | 0.5 ± 0.3 | 0.7 ± 0.5 |
| 34 | 17 | 3.4 | 0 | 1,535 | 51 | 1 | 0.6 ± 0.3 | < 0.5 |
| 35 | 18 | 3.6 | 0 | 1,515 | 51 | 1 | 0.3 ± 0.3 | 0.6 ± 0.5 |
| 36 | 7 | 1.4 | 0 | 1,039 | 35 | 0 | < 0.2 | < 0.5 |
| 37 | 21 | 4.2 | 0 | 1,574 | 52 | 2 | 0.3 ± 0.2 | < 0.5 |
| 38 | 14 | 2.8 | 0 | 1,900 | 63 | 13 | < 0.2 | < 0.5 |
| 39 | 11 | 2.2 | 0 | 1,453 | 48 | 0 | < 0.2 | < 0.5 |
| 40 | 26 | 5.2 | 0.2 | 1,444 | 48 | 0 | 0.8 ± 0.4 | < 0.5 |
| 41 | 25 | 5.0 | 0.0 | 1,468 | 49 | 0 | 0.5 ± 0.3 | < 0.5 |
| 42 | 14 | 2.8 | 0 | 1,350 | 45 | 0 | < 0.2 | < 0.5 |
| 43 | 12 | 2.4 | 0 | 1,598 | 53 | 3 | < 0.2 | < 0.5 |
| 44 | 14 | 2.8 | 0 | 1,578 | 53 | 3 | < 0.2 | < 0.5 |
| 45 | 20 | 4.0 | 0 | 1,468 | 49 | 0 | 0.3 ± 0.3 | < 0.5 |
| 46 | 13 | 2.6 | 0 | 1,342 | 45 | 0 | 0.7 ± 0.4 | < 0.5 |
| 47 | 22 | 4.4 | 0 | 1,481 | 49 | 0 | < 0.2 | < 0.5 |
| 48 | 16 | 3.2 | 0 | 1,374 | 46 | 0 | 0.4 ± 0.3 | < 0.5 |
| 49 | 17 | 3.4 | 0 | 1,470 | 49 | 0 | < 0.2 | < 0.5 |
| 50 | 12 | 2.4 | 0 | 1,419 | 47 | 0 | 0.9 ± 0.4 | < 0.5 |
| 51 | 19 | 3.8 | 0 | 1,596 | 53 | 3 | 0.5 ± 0.3 | < 0.5 |
| 52 | 17 | 3.4 | 0 | 1,476 | 49 | 0 | 0.6 ± 0.3 | < 0.5 |
| 53 | 21 | 4.2 | 0 | 1,492 | 50 | 0 | 0.3 ± 0.3 | < 0.5 |

Upper Walls and Ceiling Survey

The walls above 2 meters and the ceiling were also surveyed using the alpha and beta/gamma probes used during the surveys of the floor and lower walls. Most of the walls and ceiling radiation readings were near background. The grating for the exhaust air vent had a beta/gamma reading of 70 cpm.

Summary

No radioactive sources were left at the site. Scanning and static radiation measurements were near background levels. The alpha results did not exceed 125 cpm per 100 $cm^2$ above background. The beta/gamma results did not exceed 140 cpm above background that would indicate excessive contamination when using the SHP360 probe with a surface area of 15 $cm^2$. The maximum gross alpha wipe test was 1.7 picocurie which is less than 10% of any of the residual contamination limits calculated using the DandD code. The maximum gross beta result was 1.6 picocuries which is less than 10% of any of the residual contamination limits calculated using the DandD code. Based on these results, the Radioactive Material Storage Room appears to meet the criteria in NUREG-1757 for unrestricted release.

## Summary and Conclusion

The final status survey and test results show that the site appears to meet the criteria in NUREG-1757 for unrestricted release.

# MICHIGAN DEPARTMENT OF NATURAL RESOURCES AND THE ENVIRONMENT
## WHMD/RPS
## RADIOLOGICAL PROTECTION LABORATORY

RPL RECEIPT: 07/07/10

| SAMPLING INFORMATION: | ANALYSIS INFORMATION: |
|---|---|
| Collected By: RDS | Radionuclide(s) of Interest: |
| Department: DNRE Program: RPS | Analysis requested: |
| Collection Date: 7/7/10 | Gross Alpha [X] |
| Site Location: DNRE Terminal Road Facility | Gross Beta [X] |
| | Gamma Emitters [ ] |
| | Specific Radionuclide(s) |

| ISSUE RESULTS TO: | SAMPLE DISPOSITION: |
|---|---|
| Name: Bob Skowronek | RPL Disposal [X] |
| Department: DNRE Program: RPS | Pickup at RPL [ ] |
| Phone Number: | By: |
| FAX Number: | Phone Number: |

| SAMPLE ID NUMBER | FIELD READINGS | SAMPLE DESCRIPTION | RPL LAB NUMBER |
|---|---|---|---|
| 1 | | LARGE CESIUM ROD | SS 10-046 |
| 2 | | LARGE CESIUM TOP | SS 10-047 |
| 3 | | SMALL CESIUM 64-764 ROD | SS 10-048 |
| 4 | | SMALL CESIUM BASE | SS 10-049 |
| 5 | | COBALT-60 SOURCE 571 ROD | SS 10-050 |
| 6 | | COBALT-60 SOURCE 571 PORT | SS 10-051 |

### RPL SAMPLE ANALYSIS RESULTS

| SAMPLE ID NUMBER | Gross α µCi/wipe | Gross β µCi/wipe | | | | Total Amount of Sample ( ) |
|---|---|---|---|---|---|---|
| 1 | $<4\times10^{-7}$ | $5\times10^{-7}\pm5\times10^{-7}$ | | | | |
| 2 | $<4\times10^{-7}$ | $<5\times10^{-7}$ | | | | |
| 3 | $<4\times10^{-7}$ | $<5\times10^{-7}$ | | | | |
| 4 | $<4\times10^{-7}$ | $<5\times10^{-7}$ | | | | |
| 5 | $<4\times10^{-7}$ | $<5\times10^{-7}$ | | | | |
| 6 | $<4\times10^{-7}$ | $<5\times10^{-7}$ | | | | |

Results Issued: 8/31/10 Analyst: RDS

Additional Analytical Information or Analyst Remarks on the back of Form: [ ]

Final Sample Disposition: [X] Disposed By RPL Staff [ ] Samples Picked Up Date 08/31/10

Instructions: Fill in shaded areas at top of form and deliver the samples along with the form to:

DNRE/WHMD/RPS/Radiological Protection Laboratory
815 Terminal Road
Lansing, Michigan 48906

NOTE: WIPES WERE COUNTED July 9 AND RESULTS REVIEWED TO DETERMINE IF LEAK TEST RESULT EXCEEDED 0.005 MICROCURIES. RDS

# MICHIGAN DEPARTMENT OF NATURAL RESOURCES AND THE ENVIRONMENT
## WHMD/RPS
## RADIOLOGICAL PROTECTION LABORATORY

**SAMPLING INFORMATION:**

Collected By: RAS
Department: DNRE Program: RPS
Collection Date: 7/7/10

Site Location: DNRE Terminal Road Facility

| SAMPLE ID NUMBER | FIELD READINGS | SAMPLE DESCRIPTION | RPL LAB NUMBER |
|---|---|---|---|
| 7 | | COBALT-60 SOURCE 571 BASE | SS 10 - 052 |
| 8 | | SOILTEST Cs-137Am-241 SOURCE ROD | SS 10 - 053 |
| 9 | | SOILTEST Cs-137Am-241 SOURCE PORT | SS 10 - 054 |
| 10 | | RADIUM SOURCE ROD 7 µCi | SS 10 - 055 |
| | | | SS - |
| | | | SS - |
| | | | SS - |
| | | | SS - |
| | | | SS - |
| | | | SS - |
| | | | SS - |
| | | | SS - |
| | | | SS - |

**RPL SAMPLE ANALYSIS RESULTS**

| SAMPLE ID NUMBER | Gross α µCi/wipe | Gross β µCi/wipe | | | | Total Amount of Sample ( ) |
|---|---|---|---|---|---|---|
| 7 | $< 4 \times 10^{-7}$ | $< 5 \times 10^{-7}$ | | | | |
| 8 | $< 4 \times 10^{-7}$ | $< 5 \times 10^{-7}$ | | | | |
| 9 | $< 4 \times 10^{-7}$ | $< 5 \times 10^{-7}$ | | | | |
| 10 | $< 4 \times 10^{-7}$ | $< 5 \times 10^{-7}$ | | | | |

Results Issued: _____ Analyst: _____

Attachment 1

## Surface Contamination Limits

Table H.1, "Acceptable License Termination Screening Values of Common Radionuclides for Building Surface Contamination" in NUREG-1757, Vol. 2, "Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria: Final Report" gives an acceptable screening level for unrestricted release for some radionuclides. For other radionuclides, a DandD Building Occupancy Scenario was run using DandD Version: 2.1.0 at the default parameter settings with the contamination spread over an area of one square meter. When the activity of the parent is not distributed over the progeny in the DandD code, the parent and each progeny is assigned the concentration input into the code for the parent.

| Radionuclide | Surface Activity |
|---|---|
| Cobalt-60 | 7,100 dpm/100 $cm^2$ from Table H.1 in NUREG-1757, Vol. 2. |
| Cesium-137 | 28,000 dpm/100 $cm^2$ from Table H.1 in NUREG-1757, Vol. 2. |
| Americium-241 | A DandD Building Occupancy Scenario was run using DandD Version: 2.1.0 at the default parameter settings. A concentration of 250 dpm/100 $cm^2$ of americium-241 over an area of 1 square meter was used. The DandD Summary of Results was:<br><br>"90.00% of the 20000 calculated TEDE values are < 2.36E+01 mrem/year. The 95% Confidence Interval for the 0.9 quantile value of TEDE is 2.34E+01 to 2.38E+01 mrem/year."<br><br>Therefore, a residual surface concentration of 250 dpm/100 $cm^2$ of americium-241 could be expected to give a TEDE just under 25 millirems per year. |
| Radium-226 + Progeny | A DandD Building Occupancy Scenario was run using DandD Version: 2.1.0 at the default parameter settings. A concentration of 3,000 dpm/100 $cm^2$ of radium-226 plus progeny over an area of 1 square meter was used. In order to maximize the calculated dose, the program was directed to not distribute the initial activity over the progeny. The DandD Summary of Results was:<br><br>"90.00% of the 20000 calculated TEDE values are < 2.41E+01 mrem/year. The 95% Confidence Interval for the 0.9 quantile value of TEDE is 2.39E+01 to 2.43E+01 mrem/year."<br><br>Therefore, a residual surface concentration of 3,000 dpm/100 $cm^2$ of radium-226 could be expected to give a TEDE just under 25 millirems per year. |
| Radium-228 + Thorium-228 + Progeny | A DandD Building Occupancy Scenario was run using DandD Version: 2.1.0 at the default parameter settings. Concentrations of 320 dpm/100 $cm^2$ of radium-228 and 320 dpm/100 $cm^2$ of thorium-228 plus progeny over an area of 1 square meter was used. In order to maximize the calculated dose, the program was directed to not distribute the initial activity over the progeny. The DandD Summary of Results was:<br><br>"90.00% of the 20000 calculated TEDE values are < 2.37E+01 mrem/year. The 95% Confidence Interval for the 0.9 quantile value of TEDE is 2.35E+01 to 2.39E+01 mrem/year."<br><br>Therefore, a residual surface concentration of 320 dpm/100 $cm^2$ of radium-228 and of thorium-228 plus progeny could be expected to give a TEDE just under 25 millirems per year. |

| Radionuclide | Surface Activity |
|---|---|
| Thorium-nat + Progeny | A DandD Building Occupancy Scenario was run using DandD Version: 2.1.0 at the default parameter settings. Inputting a concentration of 55 dpm/100 $cm^2$ of Thorium-nat over an area of 1 square meter, the DandD Summary of Results was:<br><br>"90.00% of the 20000 calculated TEDE values are < 2.32E+01 mrem/year. The 95% Confidence Interval for the 0.9 quantile value of TEDE is 2.30E+01 to 2.34E+01 mrem/year."<br><br>Therefore, a residual surface concentration of 55 dpm/100 $cm^2$ of Thorium-nat could be expected to give a TEDE just under 25 millirems per year. |
| Uranium nat + Progeny | A DandD Building Occupancy Scenario was run using DandD Version: 2.1.0 at the default parameter settings. A concentration of 200 dpm/100 $cm^2$ of natural Uranium plus progeny over an area of 1 square meter was used. The 200 dpm/100 $cm^2$ was distributed in the 0.49/0.02/0.49 ratio of U-238/U-235/U-234 found in nature as follows: 98 dpm/100 $cm^2$ of U-238 plus progeny, 4 dpm/100 $cm^2$ of U-235 plus progeny, and 98 dpm/100 $cm^2$ of U-234. In order to maximize the calculated dose, the program was directed to not distribute the initial activity over the progeny. The DandD Summary of Results was:<br><br>"90.00% of the 20000 calculated TEDE values are < 2.24E+01 mrem/year. The 95% Confidence Interval for the 0.9 quantile value of TEDE is 2.22E+01 to 2.26E+01 mrem/year."<br><br>Therefore, a residual surface concentration of 200 dpm/100 $cm^2$ of natural Uranium in equilibrium with its progeny could be expected to give a TEDE just under 25 millirems per year. |

Using the above information, limits on surface measurements can be determined for the various radionuclides that would demonstrate that future TEDEs are below 25 mrem.

For radionuclides emitting alpha particles:

| Radionuclide | $Activity_{Parent}$ (dpm/100 $cm^2$) | Detection Method | # Emissions (Includes progeny) | $Activity_{Parent}$ x # Emissions x 0.5 Correction Factor for $2\pi$ Geometry (cpm/100 $cm^2$) |
|---|---|---|---|---|
| Americium-241 | 250 | Alpha | 1 Alpha Particle (Am-241) | 125 |
| Radium-226 + Progeny | 3,000 | Alpha | 5 Alpha Particles per dpm of Ra-226: Ra-226, Rn-222, Po-218, Po-214, Po-210 | 7,500 |
| Radium-228 + Thorium-228 + Progeny | 320 | Alpha | 5 Alpha Particles per dpm of Ra-228 in equilibrium with progeny: Th-228, Ra-224, Rn-220, Po-216, Bi-212 (0.35), Po-212 (0.64) | 800 |
| Natural Thorium + Progeny | 55 | Alpha | 6 Alpha Particles per dpm of Th-232 in equilibrium with progeny: Th-232, Th-228, Ra-224, Rn-220, Po-216, Bi-212 (0.35), Po-212 (0.64) | 165 |

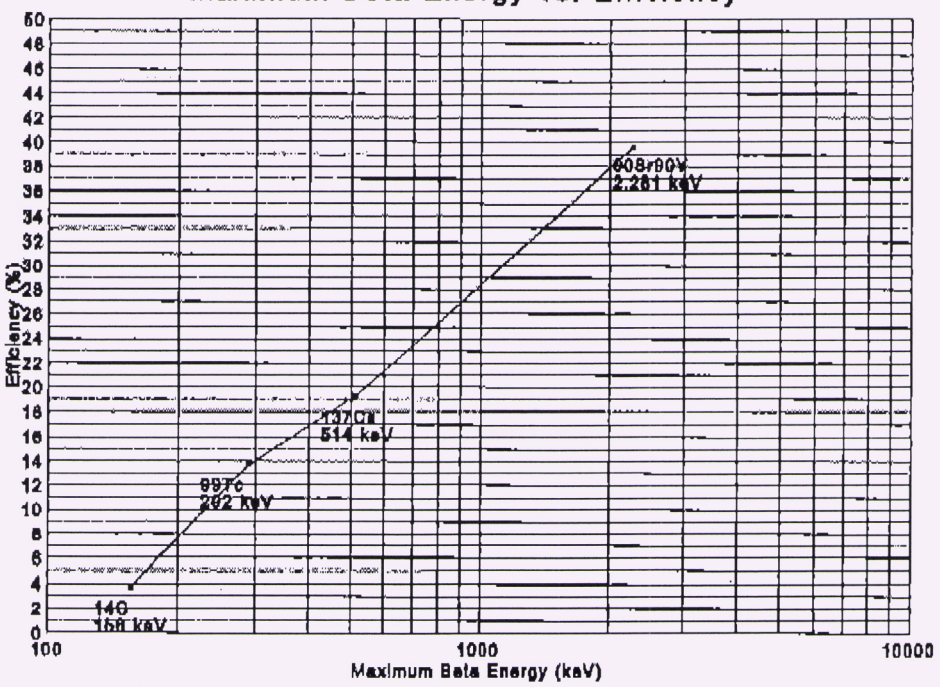
| Radionuclide | Activity$_{Parent}$ (dpm/100 cm$^2$) | Detection Method | # Emissions (includes progeny) | Activity$_{Parent}$ x # Emissions x 0.5 Correction Factor for 2π Geometry (cpm/100 cm$^2$) |
|---|---|---|---|---|
| Natural Uranium + Progeny | 200 | Alpha | 4 Alphas<br><br>For U-238 in equilibrium with its progeny including U-234 and its progeny: U-238, U-234, Th-230, Ra-226, Rn-222, Po-218, Po-214, Po-210 = 8 Alphas x 0.49 factor = 4 Alphas<br><br>For U-235 in equilibrium with its progeny: U-235 (0.83), Pa-231 (0.98), Th-227 (0.76), Ra-223 (0.95), Rn-219, Po-215, Bi-211 = 6.52 Alphas x 0.04 factor = 0.26 Alphas | 400 |

The most restrictive limit for alpha contamination from alpha emitters is the 125 cpm/100 cm$^2$ calculated for americium-241. However, in the 10 years of operation of the NCF at 815 Terminal Road, the only Am-241 received at the NCF was one wipe with an activity of 30 picocuries. Given the unlikely possibility of appreciable contamination from that one wipe, we will use the radionuclide with the next lowest surface contamination limit which is natural thorium in equilibrium with its progeny. Since the alpha probe detection area is 100 cm$^2$, any alpha reading over 165 cpm could indicate that the dose constraints are exceeded.

For radionuclides not emitting alpha particles:

| Radionuclide | Activity (dpm/100 cm$^2$) | Detection Method | Calculations | cpm/100 cm$^2$ |
|---|---|---|---|---|
| Cobalt-60 | 7,100 | Beta – 0.318 MeV max | From chart below, 0.14 cpm/dpm | 990 |
| Cesium-137 | 28,000 | Beta – 0.512 MeV max | From chart below, 0.19 cpm/dpm | 5,300 |

*Beta particle energy vs. efficiency for a G-M pancake detector*




The most restrictive limit for beta/gamma contamination is the 990 cpm/100 $cm^2$ calculated for cobalt-60. Since the beta/gamma probe detection area is 15 $cm^2$, the limit must be multiplied by a factor of 15/100. Therefore, any beta/gamma reading over 148 cpm could indicate that the dose constraints are exceeded.

Michigan Department of Natural Resources and Environment
Environmental Resource Management Division
Constitution Hall, Atrium North
525 West Allegan Street
P.O. Box 30241
Lansing, MI 48909-7741

# FAX TRANSMITTAL

Date: September 8, 2010 Pages: 18

To: Ms. Patricia J. Pelke, Chief

Materials Licensing Branch

U.S. Nuclear Regulatory Commission, Region III

Phone: 630-829-9868 Fax: 630-515-1078

From: Bob Skowronek, Chief

Unit: Radioactive Materials Unit

Section: Radiological Protection Section

Phone: 517-241-1253 Fax: 517-373-4797

Note: Attached is an amendment to NRC license number 21-05199-02. We request an expedited review.