



T
030-11241

July 18, 2005

George M. McCann, Senior Health Physicist
U.S. Nuclear Regulatory Commission
Region III Office
Materials Licensing Branch
2443 Warrenville Road Suite 210
Lisle, Illinois 60532-4352

Dear Mr. McCann:

With this letter, St. Mary's University, is requesting termination of its NRC License No. 22-00027-06 (see enclosed NRC Form 314). In support of this request for termination we have attached the NRC decommissioning survey results for the radioisotope laboratories that are authorized as storage and use areas under this NRC License.

The above NRC license authorized the possession and use of the liquid radionuclides, H-3, C-14, P-32, Tc-99m, I-125, I-131, Ba-133, Cs-137, and Tl 204. In preparation for this license termination request, all licensed radioactive materials were transferred to other licensees as per our Attachment: Section B Item 2 a or were packaged and shipped as low-level radioactive waste to Philotechnics on 6/11/03 as per our Attachment: Section B, Item 2 b.

As indicated by the enclosed decommissioning survey results, Attachment: Section C, there is no detectable fixed or removable radioactive contamination remaining in any of the former radioactive materials storage or use areas under this license which is beyond the values set by Table B.1 of NUREG 1757.

The following decommissioning attachments are enclosed in this report: The attachment labels are from NRC Form 314 and your instructions for filling out this Form

Attachment Section B, Item 2 a: Transfers to other licensees.

Attachment Section B, Item 2 b: Transfer to Waste Contractor.

Attachment Section C Surveys Performed and Reported:

Included are the radiation survey methodology for the portable survey instrument, the instrument calibration documentation, the detection efficiency calculations for the GM instrument and the liquid scintillation counter surveys. The data for the liquid scintillation surveys is included.

Again, thank you for the review of this license termination request. Please contact me at 507-457-1555 if you have questions or require additional information prior to termination of the license.

Sincerely,

Bro Jerome Rademacher
Brother Jerome Rademacher
Radiation Safety Officer
Chairman, Department of Physics

WINONA CAMPUS

700 Terrace Heights • Winona, MN 55987-1399 USA • 507-452-4430 • 800-635-5987 • www.smumn.edu

314693

JUL 20 2005

(8-2004)
10 CFR 30.36(j)(1); 40.42(j)(1);
70.38(j)(1); and 72.54(j)(1)

Estimated burden per response to comply with this mandatory collection request: 30 minutes.
This submittal is used by NRC as part of the basis for its determination that the facility is released for unrestricted use. Send comments regarding burden estimate to the Records and FOIA/Privacy Services Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0028), 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.

CERTIFICATE OF DISPOSITION OF MATERIALS

LICENSEE NAME AND ADDRESS

Saint Mary's University of Minnesota
Physics Department, #32
700 Terrace Heights, Winona, MN 55987

LICENSE NUMBER

22-00027-06

DOCKET NUMBER

030-11241

LICENSE EXPIRATION DATE

12/31/05

A. LICENSE STATUS (Check the appropriate box)

- This license has expired.
- This license has not yet expired; please terminate it.

B. DISPOSAL OF RADIOACTIVE MATERIAL

(Check the appropriate boxes and complete as necessary. If additional space is needed, provide attachments)

The licensee, or any individual executing this certificate on behalf of the licensee, certifies that:

- 1. No radioactive materials have ever been procured or possessed by the licensee under this license.
- 2. All activities authorized by this license have ceased, and all radioactive materials procured and/or possessed by the licensee under this license number cited above have been disposed of in the following manner:
 - a. Transfer of radioactive materials to the licensee listed below:
 - b. Disposal of radioactive materials:
 - 1. Directly by the licensee:
 - 2. By licensed disposal site:
 - 3. By waste contractor: Philotechnics
See Attachment Section B2b
- c. All radioactive materials have been removed such that any remaining residual radioactivity is within the limits of 10 CFR Part 20, Subpart E, and is ALARA. See survey Attachment Section C

C. SURVEYS PERFORMED AND REPORTED

- 1. A radiation survey was conducted by the licensee. The survey confirms:
 - a. the absence of licensed radioactive materials
 - b. that any remaining residual radioactivity is within the limits of 10 CFR 20, Subpart E, and is ALARA.
- 2. A copy of the radiation survey results:
 - a. is attached; or b. is not attached (Provide explanation); or c. was forwarded to NRC on: _____ Date _____
- 3. A radiation survey is not required as only sealed sources were ever possessed under this license, and
 - a. The results of the latest leak test are attached; and/or
 - b. No leaking sources have ever been identified.

The person to be contacted regarding the information provided on this form:

NAME	TITLE	TELEPHONE (Include Area Code)	E-MAIL ADDRESS
Bro Jerome Rademacher	RSO	507-457-1555	jrademac@smum.edu

Mail all future correspondence regarding this license to:
Bro Jerome Rademacher, 700 Terrace Heights, #32, Winona, MN 55987 jrademac@smum.edu

C. CERTIFYING OFFICIAL
I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT

PRINTED NAME AND TITLE	SIGNATURE	DATE
Bro Jerome Rademacher, RSO	Bro Jerome Rademacher	7/6/05

WARNING: FALSE STATEMENTS IN THIS CERTIFICATE MAY BE SUBJECT TO CIVIL AND/OR CRIMINAL PENALTIES. NRC REGULATIONS REQUIRE THAT SUBMISSIONS TO THE NRC BE COMPLETE AND ACCURATE IN ALL MATERIAL RESPECT. 18 U.S.C. SECTION 1001 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.

ATTACHMENT SECTION B 2a (NRC form 314)

TRANSFER OF RADIOACTIVE MATERIALS TO ANOTHER LICENSEE

1. **Item A Cs-137 sealed source.** NEN model NER-570 one source not to exceed 30 mCi. This source was transferred on 12/10/03. The wipe test was performed just before shipment and no leakage was found.

Recipient : Overhoff Technology Corporation
1160 US Rte. 50
Milford, Ohio 45150

Contact person: Myron Overhoff
Phone: 513-248-2400

License Number: #03213130401 Ohio Agreement State

2. **Item B Cs-137 sealed source:** Isotope Products model 193 capsule for Model HEG-137-100. 1 source not to exceed 103 mCi. This source was transferred on 11/09/04. The wipe test was performed just before shipping and no leakage was found.

Recipient: University of Wisconsin at Madison
Safety Dept.
30 North Murray St.
Madison, WI 53715

Contact person: John Micka
Phone: 608-262-4260

License Number: 25-1323-01 Wisconsin Agreement State

ATTACHMENT SECTION B 2b(NRC Form 314)

DISPOSAL BY WASTE CONTRACTOR on 6/11/03

Company: Philotechnics

Contact person: Patty Seiber
Phone: 865-285-3006

See attached forms:

ATTACHMENT SECTION C (NRC Form 314)

Survey Instruments and Equipment

1. GM Beta and Gamma Survey Instrument and Method.

Ludlum Model 3 portable survey meter, Serial Number 24031, with 2 inch diameter pancake GM probe, Model 44-9-18, SN RN010451. This instrument was on loan from the University of Minnesota .

All surfaces including floors, bench tops, sinks, shelves, drawers, fume hoods, and doors were scanned with the portable instrument described above. The surfaces were scanned on contact using a scanning rate of one detector width per second while carefully listening to the audible signal from the meter.

The efficiency of this instrument was determined using standard NEN sources for Cs-137, C-14, and Sr-90 found the following efficiencies for the GM detector used for our surveys .

C-14= 10% Cs-137= 1.5% and Sr-90 60%

These are for the 2π geometry actually used in both the scanning and the determination of the efficiency. These values are in agreement with the values given in the vendors information (Ludlum Instruments) . These determinations were done about April, 10, 2005

The sources used for these efficiency determinations were :

C-14, NEN Reference source NES-264, 0.101 uCi on 10/12/77

Sr-90, NEN Reference source NES-267, 0.021 uCi on 4/9/76

Cs-137, NEN Reference source NES-131S, 0.97 uCi on 10/7/76

Using the most restrictive results from Table B.1 of NUREG-1757 for Acceptable License Termination Screening Values we will use the value for Cs-137 as our general release criterion for surveys. Namely:

$28000 \text{ dpm} \times 0.015(\text{Efficiency}) \times 15\text{cm}^2/100\text{cm}^2 = 63 \text{ cpm}$ above natural background .

With a general natural background of about only 60 cpm . **This would put our most restrictive release criterion to be only 123 cpm.** In a few cases this was exceeded slightly and the reasons are discussed in the description of each room .

ATTACHMENT SECTION C (NRC Form 314)

2. Liquid Scintillation Analysis Instruments and Method .

The following Liquid Scintillation counter at the University of Minnesota was used for the wipes.

Beckman Liquid Scintillation Counter Model LS6500, Serial Number 455752.

Beckman Standards For Liquid Scintillation Counting			
Serial Number CNP2512	C-14	100700 DPM	29OCT03
		100682 DPM	15 JUL 05
Serial Number HNP0408	H-3	105400 DPM	29OCT03
		96934DPM	15 JUL 05

Efficiency Calibration For Liquid Scintillation Counters	
Beckman Model	LS6500
Serial Number	455752
Background (DPM)	50
H-3 DPM	61750
H-3 Efficiency	64%
C-14 DPM	98152
C-14 Efficiency	97%

For removable contamination smear surveys, areas were divided into a grid of approximately one square meter. A dry smear was taken in each grid square using Whatman filter paper. Each smear covered at least 100 square cm within the grid square (an S-shaped curve approximately two feet long). The grids are labeled in the accompanying room diagrams .

NOTE: due to the presence of paper smears or swabs, conservative counting efficiencies are used rather than the determined efficiencies obtained by counting the Beckman reference standards. Thus the count rates were reduced by a factor of 4 as shown in the following liquid scintillation print out.

ATTACHMENT SECTION C (NRC Form 314)

Survey Results

Listed above are the instruments and methods used to conduct the scanning and smear surveys for the assessment of fixed and removable contamination in the former radioactive materials use/storage areas. Attached are the results of the smear surveys.

The final survey measurements showed no results above the listed release criteria as described under the description of each room , and all survey results are within the Table B.1 values of surface and removable contamination for unrestricted release (see attached NRC guidelines for the Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use. Page 29).

TELEPHONE CONVERSATION RECORD

PERSON CALLED: Br. Jerome Rademacher, Ph.D., Radiation Safety Officer
St. Mary's University of Minnesota
Winona, MN
Fax No. (507) 457-1633
E-mail: irademac@smumn.edu
Telephone: (507) 457 1555

CALLER: George M. McCann, Senior Health Physicist
Region III, Division of Nuclear Materials Safety
Decommissioning Branch
(630) 829-9856
E-mail: gmm@nrc.gov

DATE OF CALL: March 21, 2005

REFERENCES: LISTED AT THE END OF THIS CONVERSATION RECORD

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE
TERMINATION request DATED JANUARY 10, 2005 (MAIL CONTROL
NO. 314076)

On the above date, Dr. Rademacher was contacted by Decommissioning Branch staff to clarify and obtain additional information, as a result of the staffs' review of the University's January 10, 2005, license termination request, with attached final status survey report. The specifics of the conversation are outlined below:

1. The licensee will need to account for all past licensed activities at time of termination. Review of NRC files identified the following licenses 22-00027-03, 22-00027-04, and 22-00027-05, all terminated. The RSO was asked if they possessed these licenses? He indicated that they did not. I agreed to provide copies of the licenses to him, such that he can revisit his termination request.
2. Licensee must address past 10 CFR Part 20.304 (rescinded 1981) burials. Find records to identify types, quantities of radioactive materials buried, and location. One site identified in license. Was this the only location? Will need to demonstrate that these burials meet Part 20, Subpart E, unrestricted release criteria. Specifically, a letter dated February 15, 1979, indicates that "The burial site is located approximately 40 ft. due east of the Grotto behind St. Joseph's Hall." The document indicates that records of disposal were maintained.

St. Mary's University of Minnesota

3. Licensee needs to address past licenses and other radioactive materials possessed and used prior to the 22-00027-06 license. NRC staff review of past licenses identified that other materials in unsealed form with relative long half-lives, including alpha emitters were possessed. Where were these materials used? Review of past documents indicate materials under the control of the biology department from 1958 until 1975. Determine if other laboratories were used. What happened to these long-lived materials? Were appropriate surveys done to insure adequate release, provide surveys or conduct additional surveys.

Specifically, 22--00027-04 authorized the below radioisotopes, in addition to those on the 220-0027-06 license, and were not addressed in the current termination request.:

Cl-36 1 mCi any form

Sr-90 1 micro curie

NOTE: The following individuals were indicated as the authorize users, and may be a possible source for additional information: Brothers, L. George Paul, L. Edward Chisholm and Robert E. Brown

Specifically, 22--00027-05 authorized the below radioisotopes, in addition to those on the 220-0027-06 license, and were not address in the current termination request:

Cs-137, Co-60, all the below were authorized to be possessed in any form, with a maximum of 10 mCi

Am241 unsealed = 0,2 mCi

1979 AM241 SS 1 micrC, AM241 SS 50 mCi, Cd109 SS 25 mCi, Cs 137 SS 40 mCi, Bi 207 US 2 mCi

Amendment No. 10 unsealed Am 241 removed from license., Telecon between Graden and you indicated the material was a sealed source, but I can't find source in sealed source directory. We can revisit this during our inspection or you can verify the use and provide information of the source, i.e., certificate of manufacture/disposal.

4. The licensee needs to determine if there are any collection points downstream from disposal points, that is hoods and sanitary disposal systems, which could be contaminated. Also, the licensee indicates that all sink traps were sampled, but tables only show two traps as being sampled, and one trap indicated a positive value? Also, one of the hood smears showed a positive value. Were these positive values followed up to ascertain if they were significant? There were positive values in the hood of Room 140 Brother Child's. Was this area evaluated further?

St. Mary's University of Minnesota

5. Dr. Rademacher was asked about the survey data. Specifically, we would like to see the grid map and raw data which shows the raw survey results, that is the one meter by one meter surveys with an associated smear (100 cm²), and data. The licensee needs to provide more detail on the diagrams, e.g., location of sinks, hoods, storage and work areas,
6. Also, clarify survey approach, it is indicated that NUREG 5849, was used, but it is not clear how survey areas were designated, one room appears to have been designated as an effected area, as represented by the number of smears (24), whereas the other rooms had only one smear. The licensee needs to describe and justify this. If a procedure for conducting the surveys was created, please provide this.
7. Provide information regarding the calibration of efficiency Ludlum Model 3, probe 44-9. The indicated 40% efficiency is higher than typically encountered for the type probe. Since the unit was calibrated against cesium 137, was any determination made for efficiency for lower energies, e.g. C-14 (correction/multipliers)? Also, the instrument reading for the smears is in mR/hr. These values should be counts per minute. Also, if a procedure for collection and analysis of smears was created, please advise. Also, describe and justify statement that quenching effect of smears is conservative. Also, indicate if any efficiencies using similar radioactive materials or materials with comparable energies for the radiations of interest were used, e.g., c-14 beta energies.
8. What surveys were done in the area of the former neutron source?
9. Where was the animal rooms? Prior to the 22-00027-06 license, and after? Were all these room(s) surveyed?
10. Were any animals or other organic materials ever incinerated? Part 20.2005 limits the disposal of H3 and C14 to <.05 µCi per gram of animal and liquid scintillation materials only, no other organics. There are references in the backup materials which infer that materials may have been incinerated, other than animals or scintillation liquids. Identify the incinerator and indicate if it was surveyed.
11. The Region will schedule an inspection within the near future. The purpose of this inspection will be to review records and to conduct confirmatory surveys.

IN ANSWER TO YOUR TELEPHONE REQUEST OF MARCH 21, 2005 FOR ADDITIONAL INFORMATION REGARDING OUR LICENSE TERMINATION REQUEST, I OFFER THE FOLLOWING INFORMATION IN ANSWER TO EACH OF THE QUESTIONS ASKED.

1. and 2. Account for each of the past licenses used prior to the present license.

22-00027-03: The Cobalt 60 sources mention in this license were not here when the present RSO came in 1974. As per the last page of that document, the Co-60 was transferred to the College of St. Theresa, Winona, MN License number 22-3475-1. This document is dated April 4, 1966.

22-00027-04: According to the certification received and accepted on April 2, 1965, the items in this license were disposed of in compliance with the provisions of 10 CFR 20.

22-00027-05: Some of these items were not possessed and the other ones were carried over to the new license, 22-00027-06, and their disposal was taken care of under that last license and its various amendments.

Rooms and areas that were previously use in the radiological program were identified and are now included in the survey information. Many of these have been renovated with the addition of Brother Charles Hall in 1987. This is discussed in the survey results.

To the knowledge of the present RSO no unsealed Am -241 source was ever owned or used by the school. We did have a 50 mCi sealed source that was used as an XRF source and not an alpha source. It was an Isotope Products source #ANT 241-50 and was transferred to the University of MN (License # 22-00187-46 in about August of 2003)

3. Only one burial site is known on campus and that is described in the letter of Feb 15th, 1979. The record of this burial has been recovered and the data has been sent to the NRC and then plugged into the Argonne National Laboratory RESRAD program. The results of these calculations are still pending but since the amounts buried were so small and the area was surveyed with negative results it is felt that this is not a problem.

4. After speaking with the maintenance department it was determined that there are no potential collection points downstream of the disposal points in either the sewage or the air system. Moreover the total radioactive quantities involve in each disposal was rather small.

All radioactive waste was disposed of in the new radiation room in 232 Brother Charles Hall. This has two sinks only one of which is routinely used for disposal. These were the two traps sampled and no contamination was found. Prior to the building of Bro. Charles Hall

the radioisotope room was room 212 of Hoffman Hall. This room was carefully surveyed when it was decommissioned but no records of this survey were maintained. Therefore this room was resurveyed as a result of this decommissioning process. The results are given in the decommissioning forms. Since the sink and hood were removed they could not be tested. No radioactive gases were ever used in the hood.

The hood in room 140 Brother Charles Hall was resurveyed the small positive result was found to be insignificant. It was in the Tritium channels with a very high luminescence factor

5. Brother Rademacher has provided more detail in the new room diagrams as requested. A detailed grid was used in the "affected area" rooms surveyed as result of this conversation. If a grid was not used a justification is given. Generally a grid was not used in "unaffected areas", i.e. in areas where only sealed sources were used or where only very short half life isotopes are used. Any area were unsealed sources of half-life greater than three weeks were used was designated an "affected area." It has been well over a year since we have performed any experiments with these isotopes. The results of these additional surveys are included in the revised survey results as we resubmitted our NRC 314 form.

6.

A. Describe or provide the procedure for conducting the surveys. See attached decommissioning form (NRC 314) In compliance with request by the NRC

B. Survey done in the area of the former neutron source was done with our Model 3 Ludlum survey meter #95676 Using Model 44-9 serial #93674 This instrument was recalibrated on March 27, 2005 with the following results at one inch.

C-14 NEN 0.1 uCi gave 2500 cpm on the X1 scale (about 1% efficiency)

Sr-90 NEN 0.01 uCi gave 3000 cpm on the X1 scale(about 10% efficiency)

Cs-137 NEN 0.48uCi gave 5400cpm on the X1 scale(about 0.25% efficiency)

All more recent surveys were done with this instrument and the comparison method was used to determine the degree of contamination. It is realized that this was not a terribly accurate calibration but if contamination was found it would be sufficient. The wipes were again counted at the University of MN with the calibration data as given in the report NRC 314 .

C. The animal room has not been used for radiation experiments for the past 15 years but a survey was performed to verify lack of contamination.

D. From the above data taken in the lab, the 44-9 probe has about a 1% efficiency for C-14, a 10% efficiency for Sr-90 and about a 5% efficiency for Cs-137 at 1 inch which is about the distance we placed the probe above the surface.

E .All scintillation counter reading are in DPM .

F. The efficiency of the scintillation counter for H-3 is given at about 65% We have used a value of 25% because of the presence of filter paper and cloudiness. This is almost a factor of 3 which we feel is fairly conservative.

7. There were never any animals or other organic materials incinerated at the site except for the three recorded burns of Liquid Scintillation fluids containing C-14 and H-3 . These were the older cocktails and contained Toluene and therefore could not be put down the drain. With the advent of environmentally benign cocktails we stopped the process of incineration. The three burns took place on 3/23/82, 2/1/85, and 10/4/87. In each case there was less than 10 mCi of H-3 and C-14 which was mixed with over 5,000 gallons of fuel oil (they were 10,000 gallon tanks) The fuel was eventually burned in the University boilers.

Using the following simple calculation we can see that this is well below the .05 uCi/gm limit.

$$\frac{10 \text{ mCi} \times 1000 \text{ uCi} / \text{mCi}}{5000 \text{ gal} \times 28,000 \text{ ml} / \text{gal} \times 0.75 \text{ g} / \text{ml}} = 9.5 \times 10^{-5} \text{ uCi} / \text{g}$$

In each case the total activity was much less than the 10mCi used in the calculation and the circulating pumps in the fuel tanks guaranteed that it was thoroughly mixed before burning.

I believe that with the above comments on the questions posed and the addition of the areas surveyed we have addressed all of your concerns. Please let me know if I can be of further help.

webmail



Read Mail (message 13 of 75)

Close

Date Sent: 6/23/2005 12:17 PM

From: "George McCann" <GMM@nrc.gov>

To: <JRADEMAC@smumn.edu>

Subject: re: TELECON RECORD

Status: Urgent Unseen

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Printer friendly view

Brother Jerome

Please give me a call this afternoon or on Friday 630 829 9856.

1. Need to resurvey the laboratories with functional instrument
2. Need to revise diagrams
3. Need to resurvey old lab. Remove furniture and possibly the carpet
4. Need to have all values below the screening values, no area factor allowed for screening values
5. Need to describe how release criteria applied
6. Need to replace instrument or obtain an appropriate meter
7. Need to dispose of waste appropriately
8. Need to address the alpha detected in safe
9. Are you getting assistance from a consultant or Minnesota to clean-up and resurvey labs.
10. I will have the final report on our smears for removable contamination probably early next week.

I will consider the end date of this inspection when I call to advise you of the lab results. Also, I would like to put into the report positive actions regarding the above. Also, I would appreciate a schedule for completion of remediation activities and resurvey. Let me know if you find any more rooms or contamination once you or your consultant uses an appropriate meter Also, Dr Shields should probably in on the final exit call.

Thanks

Mike

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Dear Mr. McCann:

In answer to your e-mail of June 23, which is attached I offer the following results.

1. We have surveyed all of the areas with the meter from the U. Of MN which is mentioned in our form 314 report.
2. We have revised all of our diagrams and added another 250 wipe areas.
3. As show in our photograph we have removed all of the furniture from 212 Hoffman Hall, the former radiation preparation room and carefully surveyed the area using the meter from the University of Minn. . Because the new carpet was glued down we did not remove it. However, we did carefully survey all of the plumbing exit points.
4. We used the most restrictive values from Table 2B.1 of NUREG 1757 using our hottest spots.
5. Our release criteria are explain in out 314 report.
6. It was found that our GM counter was reading high and so we bought a new GM tube from Ludlum as was suggested. It should be noted however that none of the original surveys were done with this meter but were done with the calibrated U of MN meter. However, at the time of the inspection we had already returned this meter to the U of MN. Since that time we have again borrowed the proper meter from the U of MN to complete the suggested surveys.
7. All of the waste was properly disposed of. All washing were diluted and disposed of according to 10 CFR part 20.
8. The alpha that was detected in the safe area was not indeed alpha but rather an over response of the alpha scintillation detector. This was proven by placing a double layer of aluminum foil between our GM detector(which claims a 30% efficiency for alphas and there was no change in the count rate. We were not aware of storing any alphas in that safe. Even if it were alpha, it was not removable as was shown by the extra wipes that we took of the hot spots. 6 MeV alphas have a range of only 3cm in air. Moreover , after further decontamination the hot spots were less than 120 cpm.
9. We had Brian Vetter from the University of MN come down this weekend (July 2nd) and he checked out our results and methodology. In general he was pleased with our results. At his and your suggestion we did considerably more wipes of certain areas and resurveyed other areas. We should get the results of these wipes this week (July 4th).

Sincerely yours,

Bro Jerome Rademacher

Brother Jerome Rademacher, RSO

RESULTS OF SURVEY FOR POSSIBLE CONTAMINATION

The following rooms were used in various ways over the duration of the licenses to be terminated. The logic behind the surveys and the results are presented below. First we will discuss the use and history of the rooms .

Room 232 Brother Charles Hall(wipes 1-24 and 51-81 , Glass ware 91-102, Safe 153-155) : **This is the Radioisotope room** and most wet chemistry was performed in this room. Unsealed sources were confined to this room with a few exceptions. This room was thoroughly surveyed and wiped. A few contaminations were found and eliminated. The results of the final surveys are given below. The shelves and drawers were done later and the results are presented below. The radiation safe was in this room and the possible alpha contamination is addressed in the answers to the questions posed by the NRC inspectors which is found in this report on page 15 of this report .

Room 230 Brother Charles Hall:(wipes 103-106) **This is the Instrument room** and for several years we had a Beckman Liquid Scintillation Spectrometer in the northwest corner of this room. All samples were prepared in the radioisotope room and only sealed samples were counted. It was decided not to repair the counter and it was returned, with its source to the manufacturer last fall. The area where contamination was possible was surveyed and wiped in a limited fashion. The sink and trap was wiped later.

Room 201 Hoffman Hall:(wipes 156-200, and 237-240) **This is the Freshman Physics lab** and one experiment is performed each year using 2.5 min Ba-137 sources so no contamination was expected to be found. This elution was to be done on a tray in the back of the room. However we did find some Cs-137 (Ba-137), probably leakage from the elution of the 10 uCi .Ba-137 generators which are over 10 years old. The fact that it was Cs-137 was determined by gamma spectroscopy using our NaI detector and the MCA. After decontaminating the areas involved we dropped the count in the hot spots to about 120 cpm which is the release level for our most restrictive isotope which happens to be Cs-137. This contamination was not removable as was shown by subsequent wipes of the area.

Room 208 Hoffman Hall(wipes 203-236) : **This is the Radiation counting room.** Again, other than a single annual experiment using the Cs.-Ba generators as discussed above, no unsealed sources were used in this room and it is regularly surveyed for contamination. However, after our experience with room 201 described above, we did a more thorough survey and wipe of this room. No contamination was found as is indicated in the attached liquid scintillation data.

When we had a Pu-Be neutron source it was kept in this room and was regularly checked for leakage. These records are available. We disposed of this source in 1995 by returning it to LANL.

It was later remembered that we used to keep the older liquid scintillation counter in the little alcove to the left of the door so this area was wiped later and is included in the diagram.

Room 212 Hoffman Hall(no wipes) : This is the old Radiation Source room. It was surveyed and decontaminated when we moved to our new facility . The sink and hood were removed and no contamination was found. Because the walls were painted and a new floor installed no wipes were done. However every thing was removed from the room and it was surveyed and no contamination was found.

Room 136, Brother Charles Hall: (wipes 140-152) This is now a storage room . It was formerly a radioactive source storage room until about 1987. At that time it was surveyed but no records were kept. This was the area where there was a Sr-90 spill and there was some slight Sr-90 contamination as determined by gamma spectroscopy as mentioned above. The area was decontaminated and subsequent wipes showed no removable contamination. The few remaining hot spots were shown to have less than 300 cpm which is well below the conservative estimate of 525 cpm taken from Table B.1 of NUREG 1757 .

$$7000\text{cpm} \times 0.50 \times 15/100 \text{ cm}^2 = 525 \text{ cpm} .$$

Here , to be conservative, we used 7000 cpm instead of the 8700 cpm /100cm² given in Table B.1 and we used a 50% efficiency for the detector instead of the 60% we actually measured. Moreover this is a storage room and is seldom used.

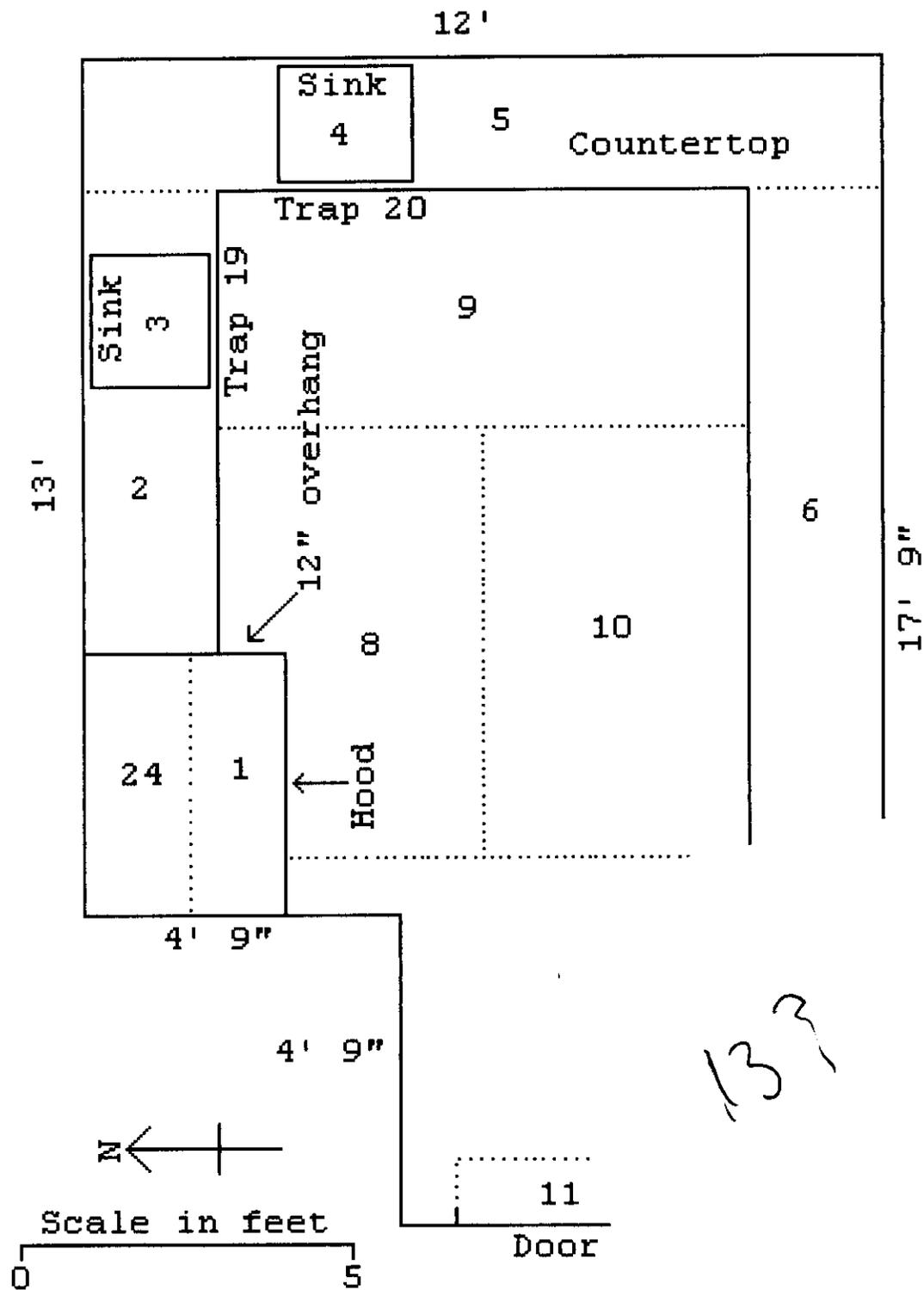
Room 140, Brother Charles Hall:(wipes 112-121 and 247-256) **This is one of the Biology research rooms** and the hood and table at this end was used for H-3 and C- 14 experiments for a few years by Dr. Donald Alsum. It has not been used for radioisotope work in the last 10 years. The areas used have been surveyed and wiped and the results are presented below. The sinks and traps were done later

Room 139, Brother Charles Hall:(wipes 107-111) **This is the Physiology lab** and from 1987-2003 experiments with I-131 were regularly performed here. These labs were surveyed with GM counters immediately after use and the rats were held for disposal. Because of the short half life of I-131 wipes were not necessary but were performed in the areas that were used. The results are given below.

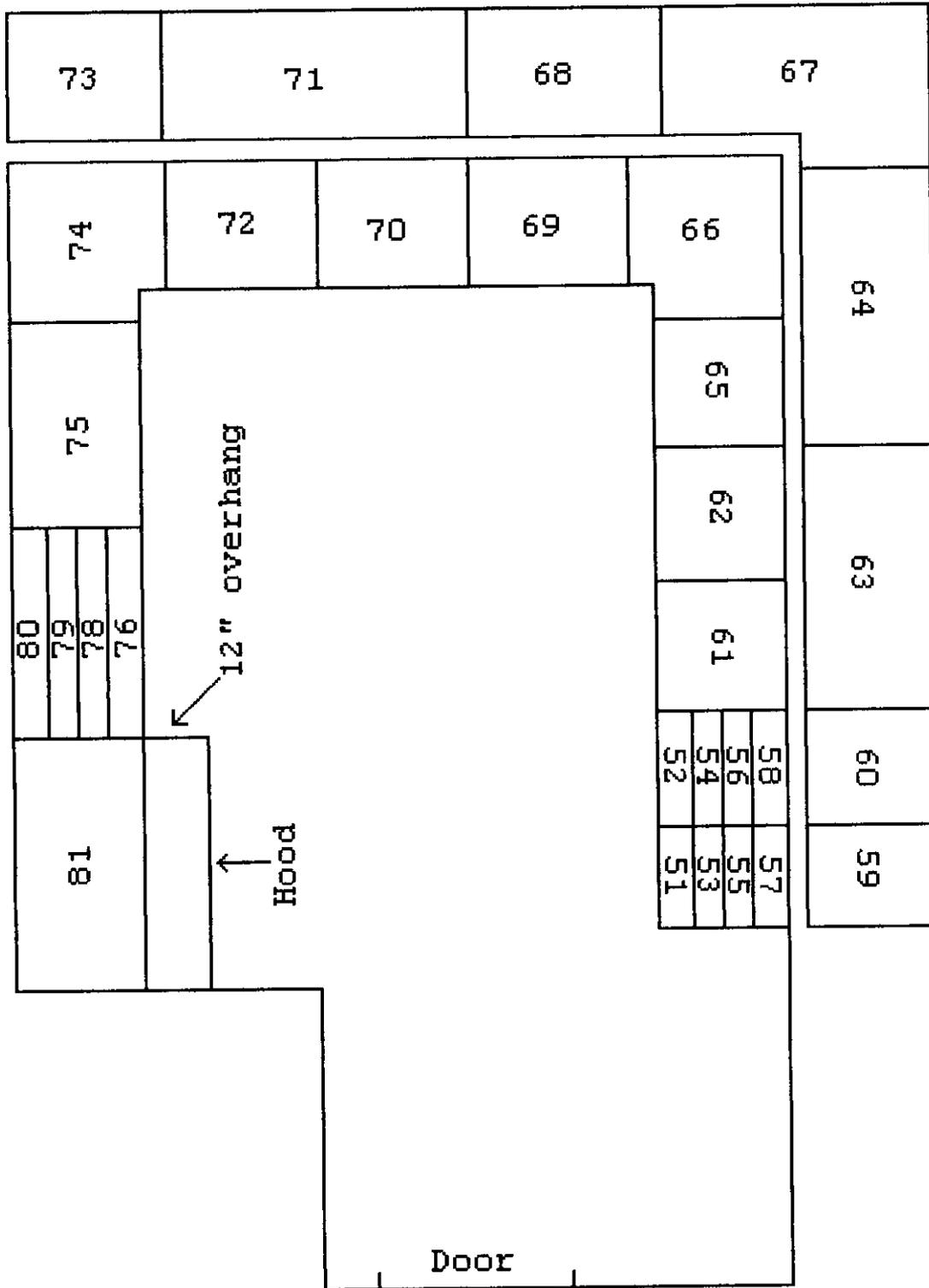
Room 115 Hoffman Hall:(wipes 124-129) **This is the animal room.** To my knowledge no animals were injected with long lived radioisotopes and kept in this room certainly not in the 30 years that I have been here. Moreover the room is washed out and the cages cleaned each year. It was not felt that wipes or GM surveys were needed but they were taken and the results presented below.

Room 110 Hoffman Hall:(no wipes) **This was the former physiology lab** and some animal experiments were performed. However it was completely gutted over 20 years ago and the furniture, hoods and floor were replaced. No wipes were taken in this area but it was surveyed with negative results.

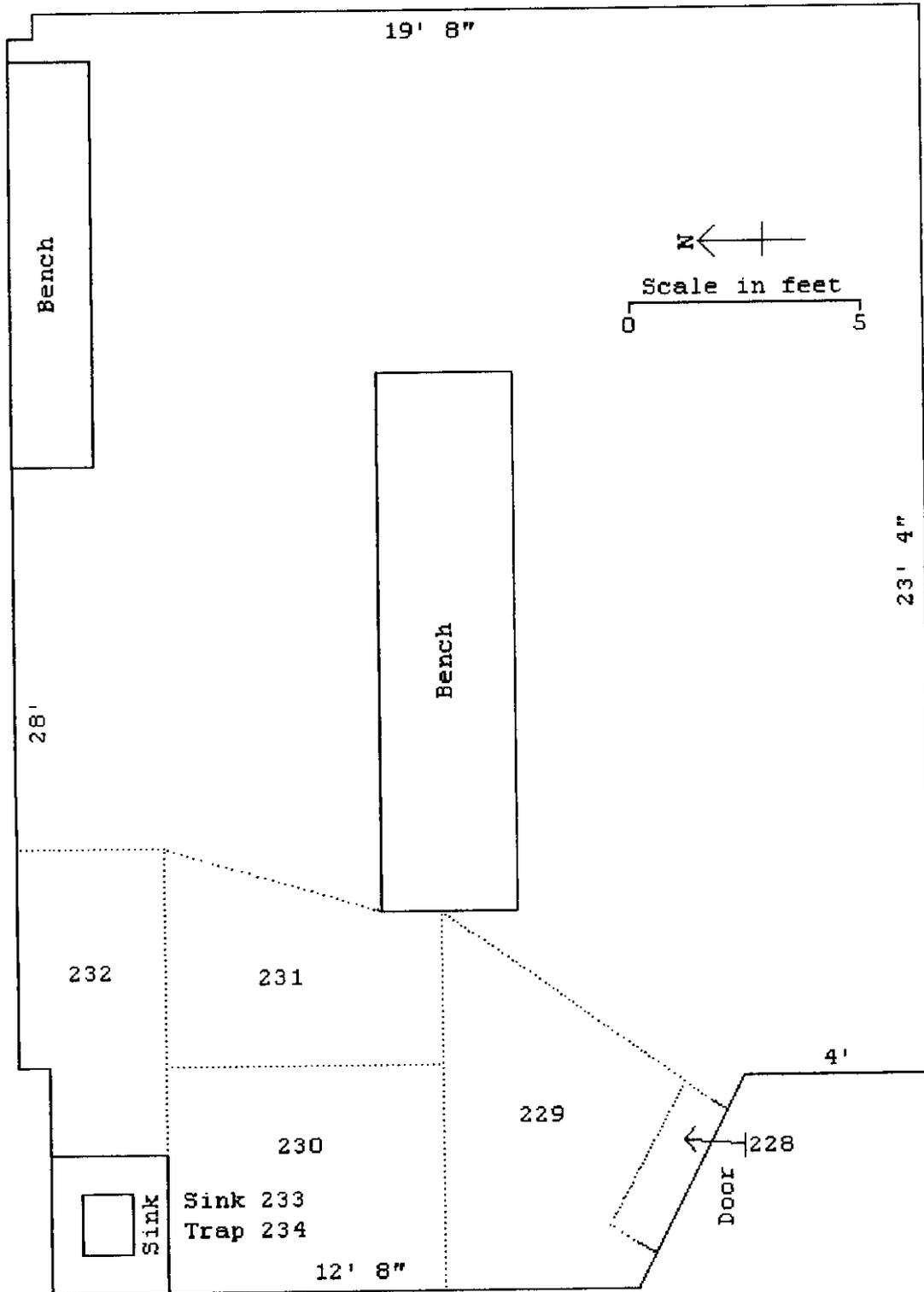
232 Bro. Charles Hall – Radioisotope Lab



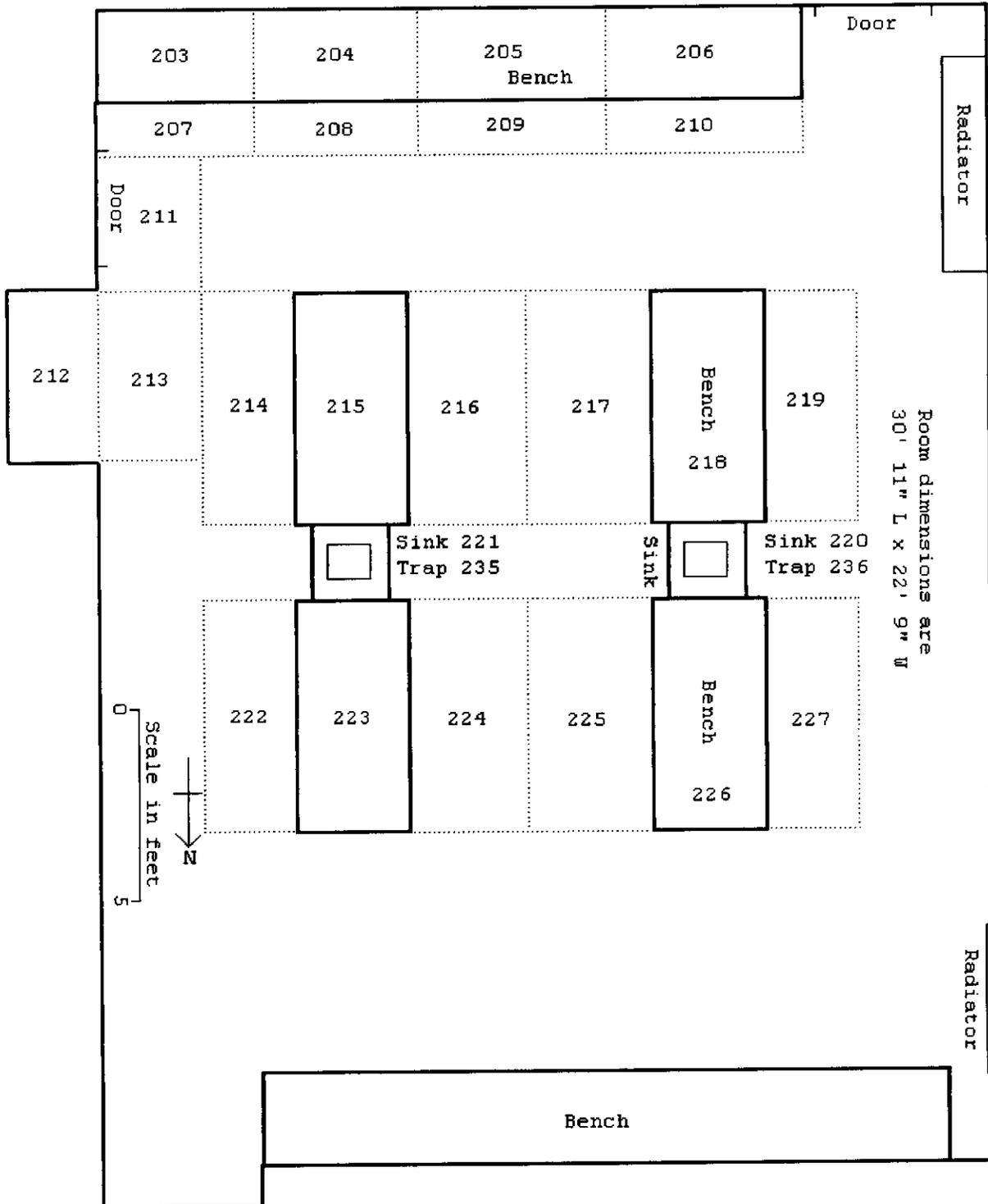
**232 Bro. Charles Hall – Radioisotope Lab
Cabinets and Walls**



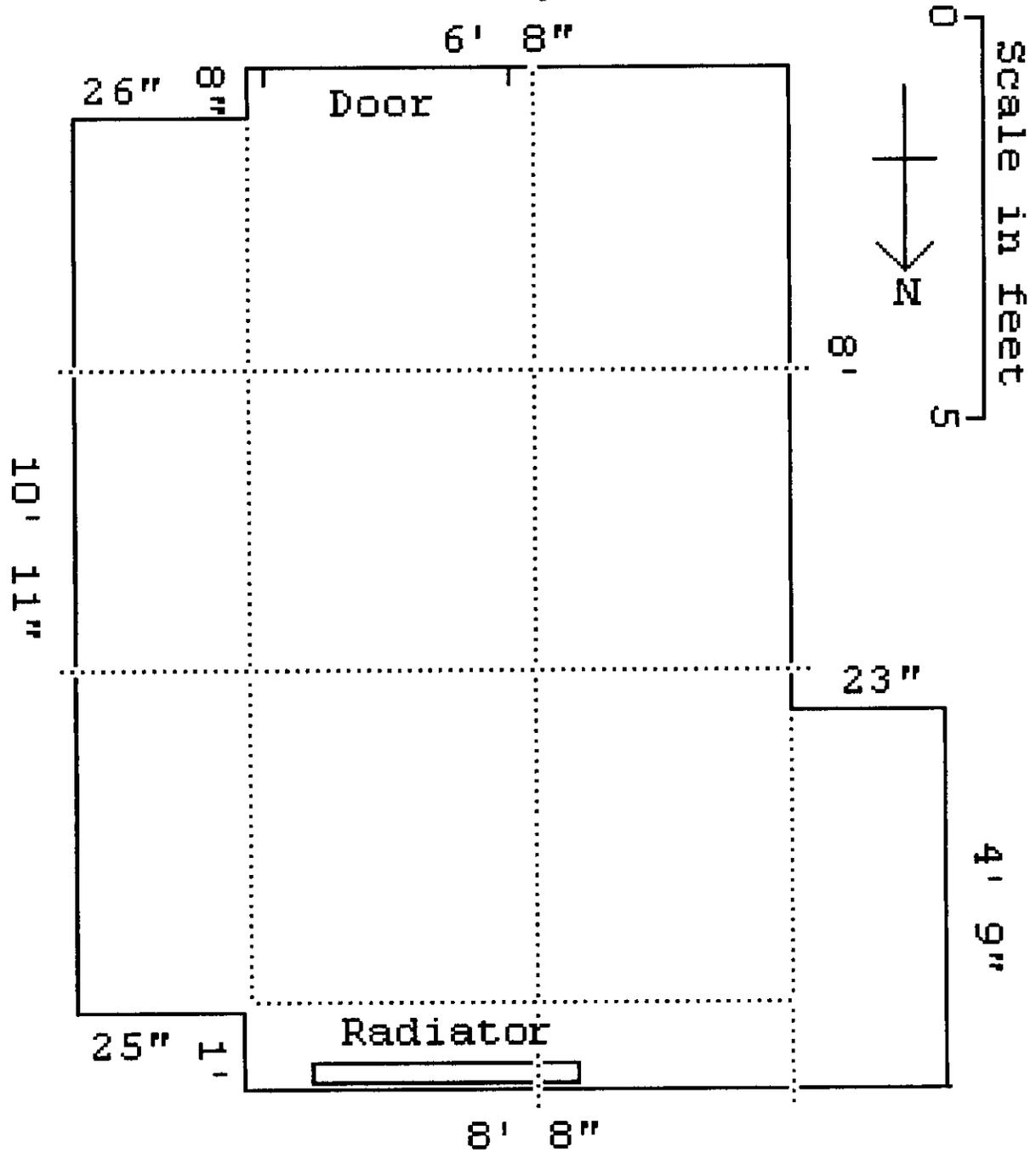
230 Bro. Charles Hall – Instrumentation Lab



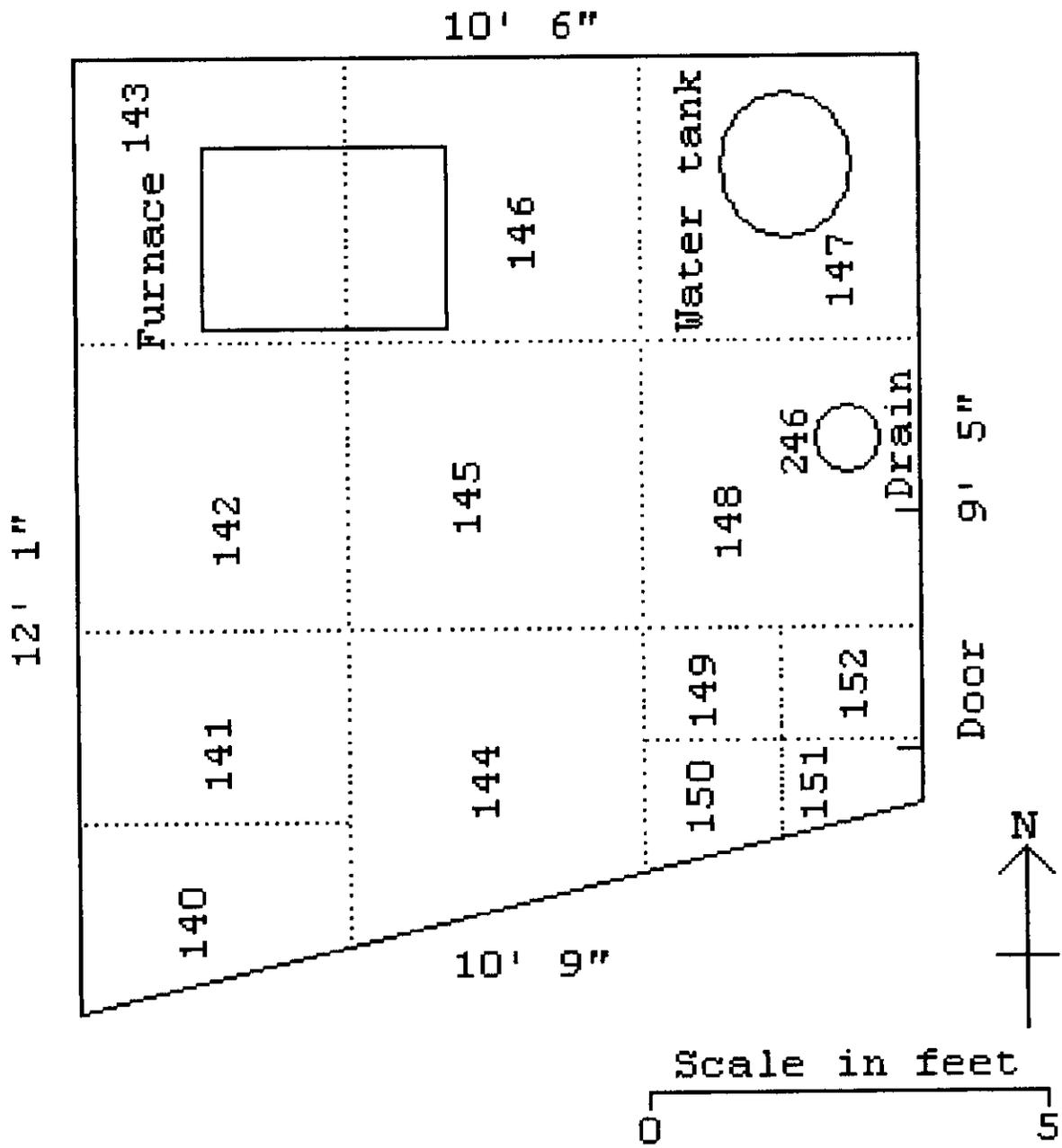
208 Hoffman Hall – Radiation Lab



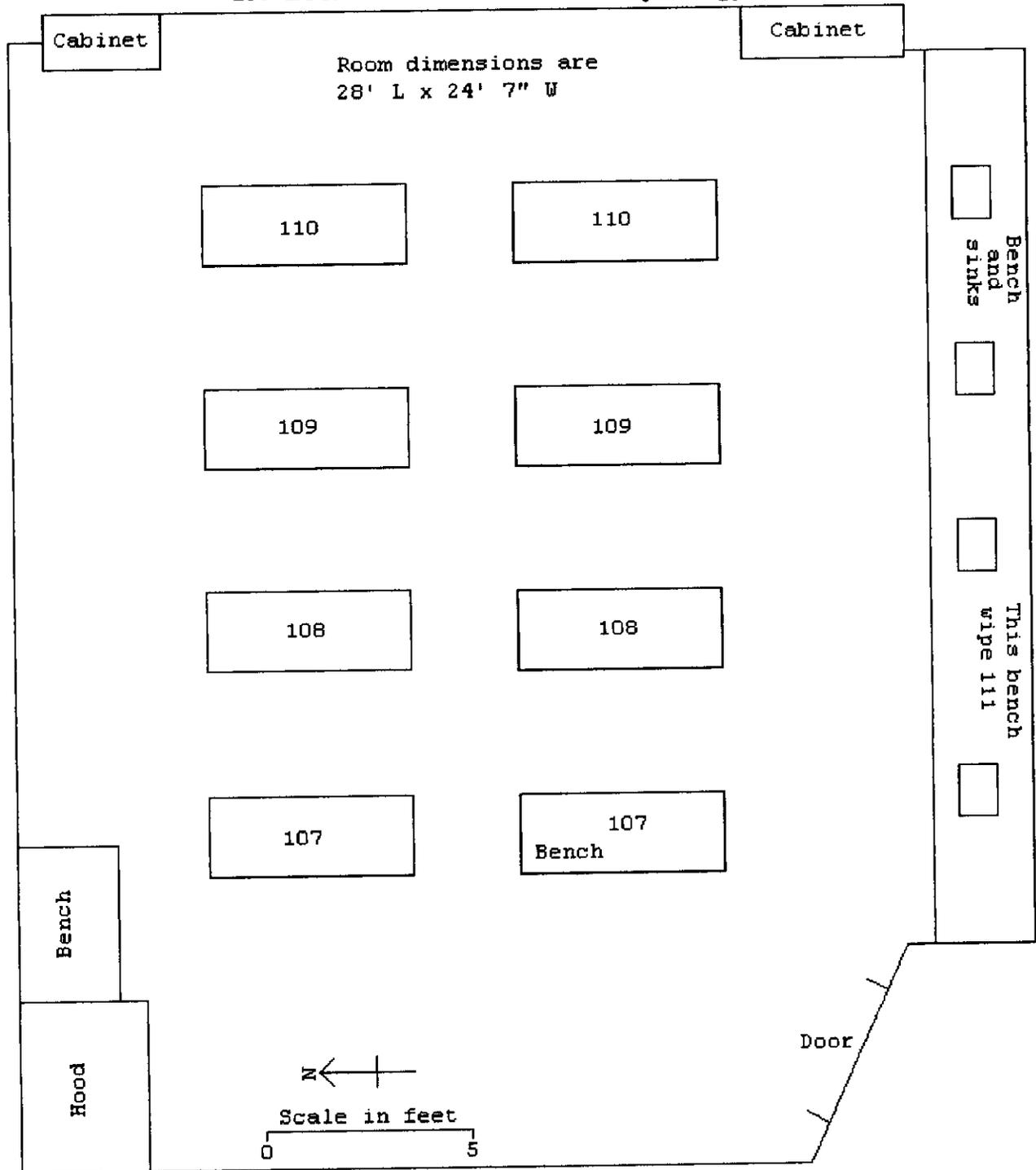
212 Hoffman Hall – Old Source Room
No Wipes



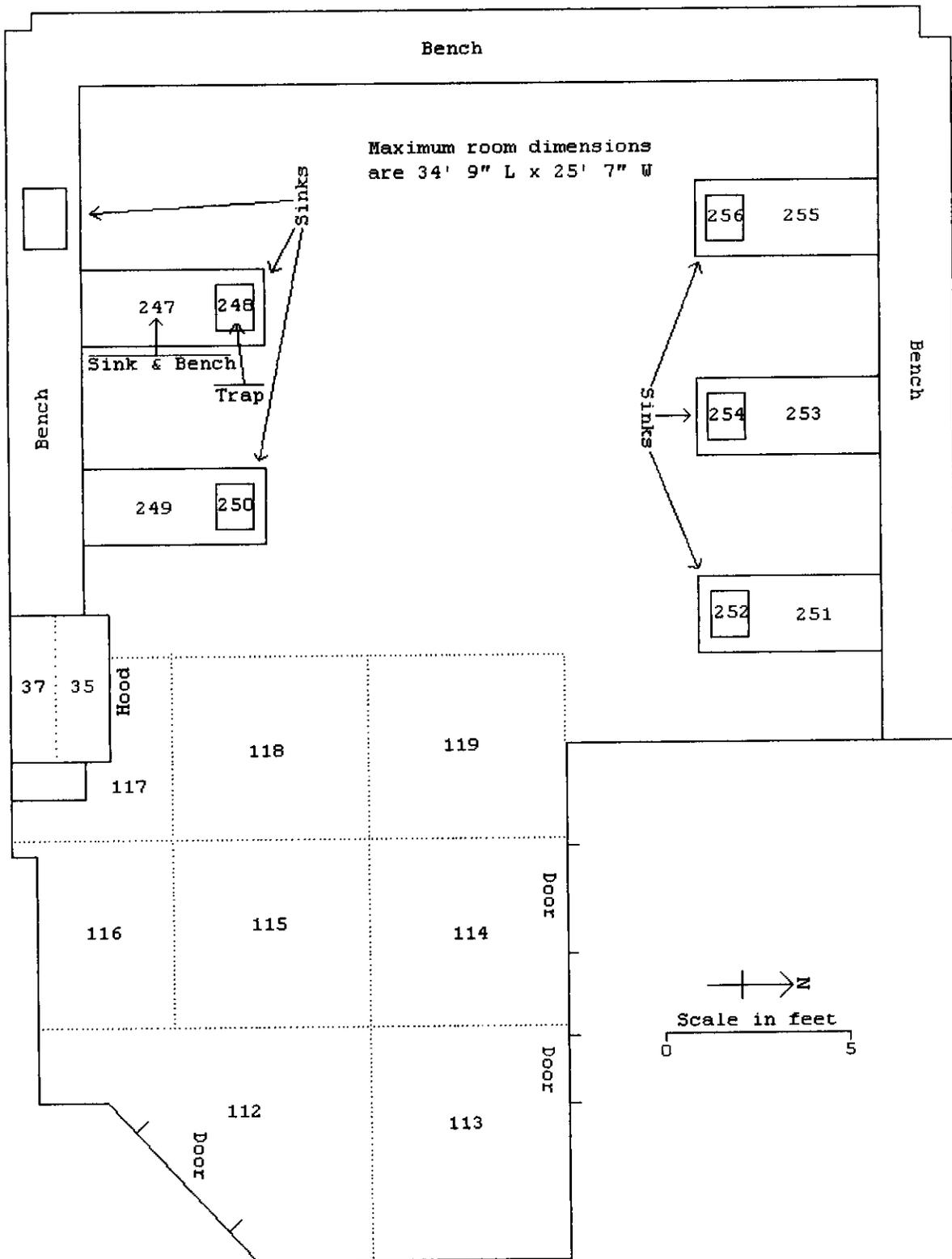
136 Bro. Charles Hall - Old Rad Storage Room



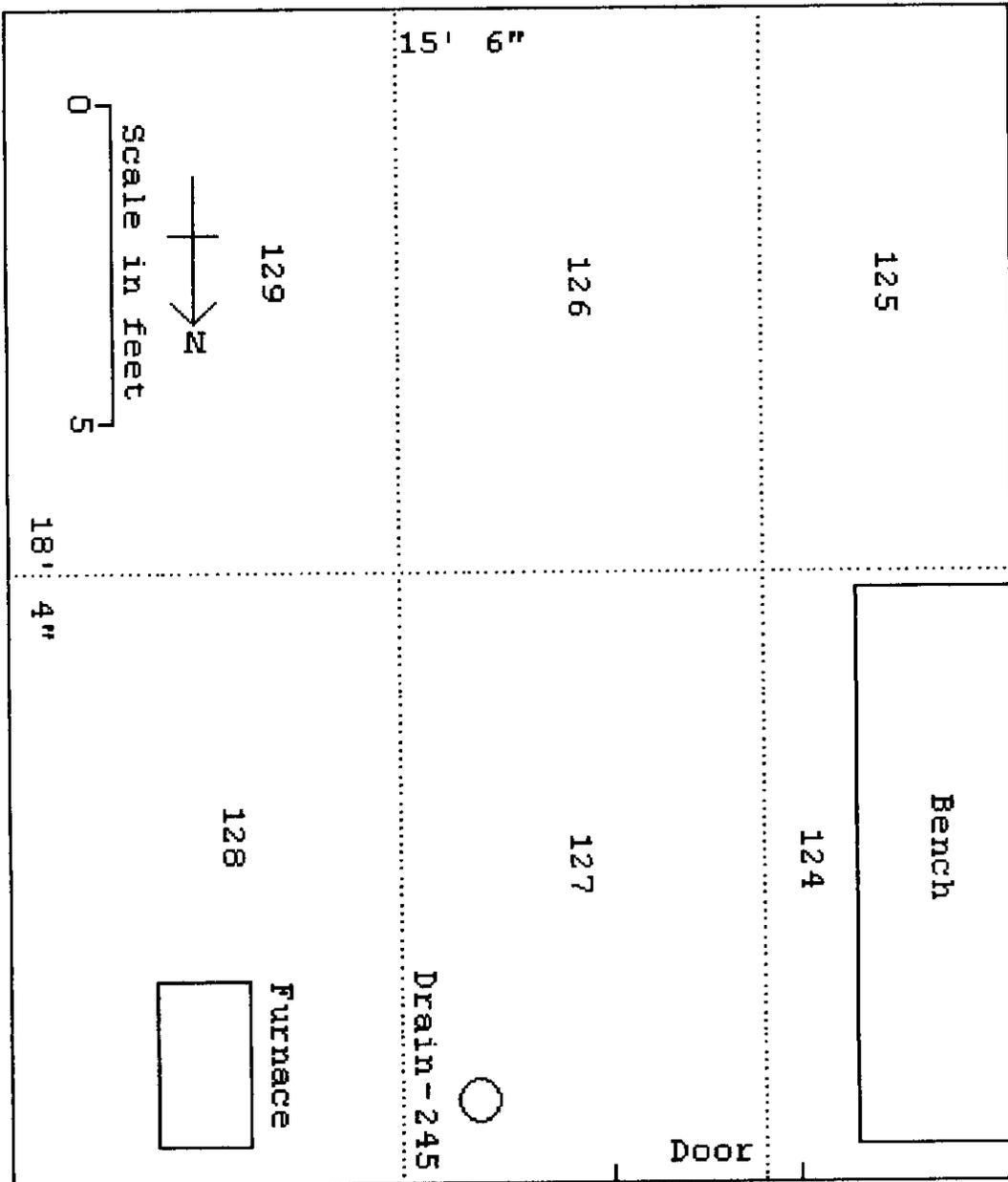
139 Bro. Charles Hall – New Physiology Lab



140 Bro. Charles Hall – Research Lab



115B Hoffman Hall – Animal Room



**110 Hoffman Hall – Old Physiology / New Toxicology Lab
No Wipes**

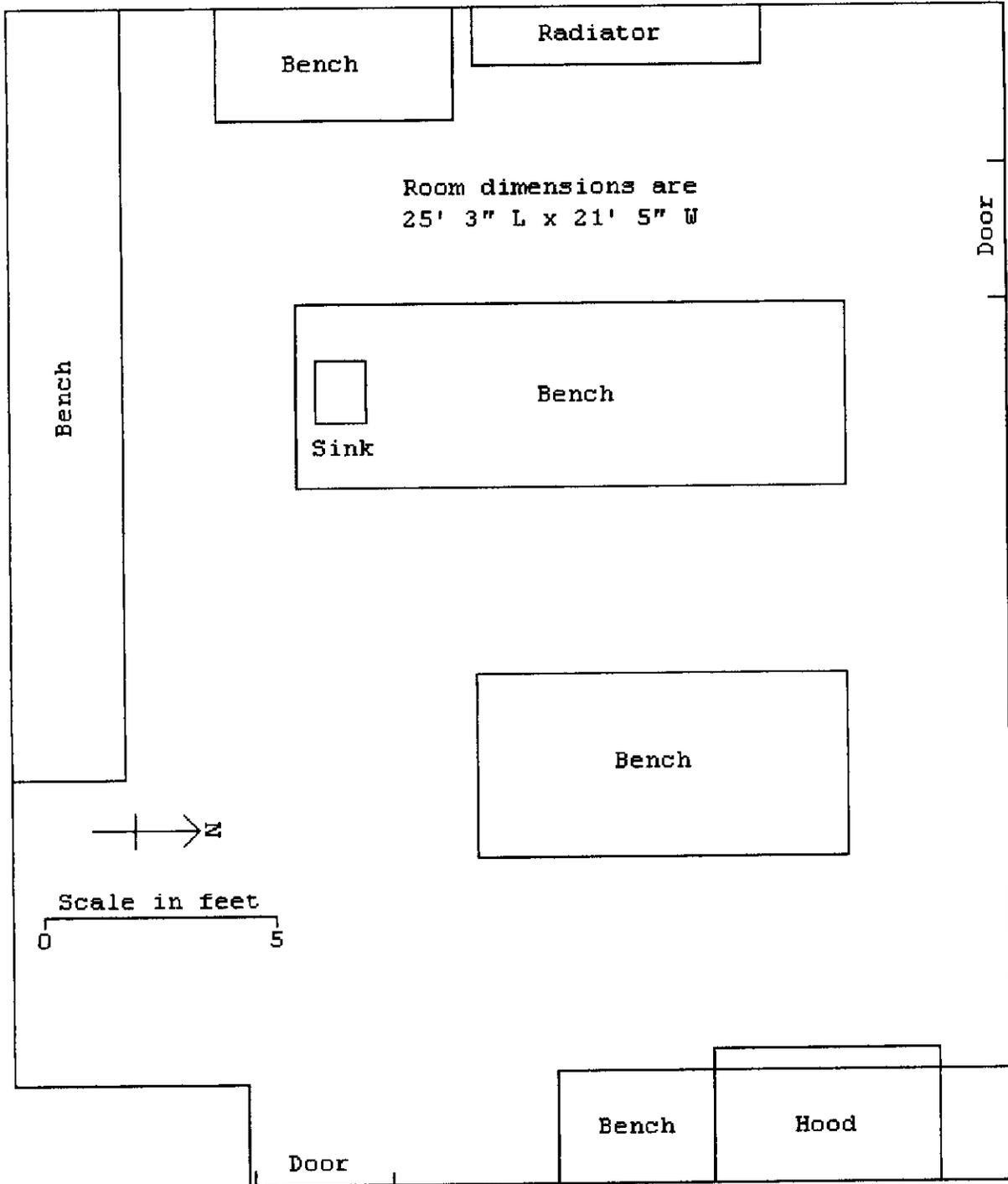


Table B.1 Acceptable License Termination Screening Values of Common Radionuclides for Building-Surface Contamination

Radionuclide	Symbol	Acceptable Screening Levels ^a for Unrestricted Release (dpm/100 cm ²) ^b
Hydrogen-3 (Tritium)	³ H	1.2E+08
Carbon-14	¹⁴ C	3.7E+06
Sodium-22	²² Na	9.5E+03
Sulfur-35	³⁵ S	1.3E+07
Chlorine-36	³⁶ Cl	5.0E+05
Manganese-54	⁵⁴ Mn	3.2E+04
Iron-55	⁵⁵ Fe	4.5E+06
Cobalt-60	⁶⁰ Co	7.1E+03
Nickel-63	⁶³ Ni	1.8E+06
Strontium-90	⁹⁰ Sr	8.7E+03
Technetium-99	⁹⁹ Tc	1.3E+06
Iodine-129	¹²⁹ I	3.5E+04
Cesium-137	¹³⁷ Cs	2.8E+04
Iridium-192	¹⁹² Ir	7.4E+04

525cpm

63cpm

Notes:

- a Screening levels are based on the assumption that the fraction of removable surface contamination is equal to 0.1. For cases when the fraction of removable contamination is undetermined or higher than 0.1, users may assume, for screening purposes, that 100 percent of surface contamination is removable, and therefore the screening levels should be decreased by a factor of 10. Alternatively, users having site-specific data on the fraction of removable contamination, based on site-specific resuspension factors (e.g., within 10 percent to 100 percent range), may calculate site-specific screening levels using DandD, Version 2.
- b Units are disintegrations per minute (dpm) per 100 square centimeters (dpm/100 cm²). One dpm is equivalent to 0.0167 becquerel (Bq). Therefore, to convert to units of Bq/m², multiply each value by 1.67. The screening values represent surface concentrations of individual radionuclides that would be deemed in compliance with the 0.25 mSv/y (25 mrem/y) unrestricted release dose limit in 10 CFR 20.1402. For radionuclides in a mixture, the "sum of fractions" rule applies; see Part 20, Appendix B, Note 4.

UNIVERSITY OF MINNESOTA



Department of
Environmental Health and Safety

W140 Boynton Health Service
410 Church Street SE
Minneapolis, MN 55455

612 626-6002 Phone
612 624-1949 Fax

■ DATE: JULY 15, 2005

■ TO: Bro. Jerome Rademacher

■ COMPANY: SMU MN

■ FAX NUMBER: 507.457.1633

● FROM: Brian J Vetter

● NUMBER OF PAGES: ~~6~~ 7
(INCLUDING THIS COVER SHEET)

■ NOTES:

All 256 smears

H-3, then C-14 standards

TRACER SURVEY

COMMENT: DECOMMISSIONING SHEEP SURVEY

USER: IS

RESET TIME : 1.00
 DATA COLD : ON
 COUNT BLANK : NO
 TWO PASS : NO
 SCINTILLATOR : LIQUID
 LOW LEVEL : NO
 IS : NO SAMPLE REPEATS : 1
 IC# : YES REP. IC# : 1
 ADD : NO CYCLE REPEATS : 1
 LUMEX : NO LOW SAMPLE REJ : 0
 HALF LIFE CORRECTION DATE : NONE
 PRINTER : HP
 R5000 : OFF

ISOTOPE : ⁵⁴Fe XERROR: 0.00 FACTOR: 4.200000 SKD. SIB: 23
 WIDE OPEN WINDOW XERROR: 0.00 FACTOR: 4.000000 SKD. SIB: 61

SAM NO	POS	TIME MIN	IC#	WIDE		LUMEX		ELAPSED TIME	
				CPM	XERROR	%			
1	44-1	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
2	44-2	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
3	44-3	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
4	44-4	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
5	44-5	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
6	44-6	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
7	44-7	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
8	44-8	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
9	44-9	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
10	44-10	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
11	44-11	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
12	44-12	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
13	44-1	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
14	44-2	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
15	44-3	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
16	44-4	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
17	44-5	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
18	44-6	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
19	44-7	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
20	44-8	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
21	44-9	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
22	44-10	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
23	44-11	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
24	44-12	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
25	44-1	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
26	44-2	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
27	44-3	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
28	44-4	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
29	44-5	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
30	44-6	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
31	44-7	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
32	44-8	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
33	44-9	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
34	44-10	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
35	44-11	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
36	44-12	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
37	44-1	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
38	44-2	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
39	44-3	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
40	44-4	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
41	44-5	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
42	44-6	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
43	44-7	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
44	44-8	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00
45	44-9	1.00	124.0	0.00	1.0+00	0.00	1.0+00	0.70	0.00

SAR NO	POS	TIME MIN	ICH	3H		WIDE		LUMEX #	ELAPSED TIME
				DFM	%ERROR	DFM	%ERROR		
162	**1-6	1.00	169.1	0.00	1.0+00	50.00	100.04	0.10	015.00
163	**1-7	1.00	173.4	0.00	1.0+00	130.00	50.70	0.00	020.00
164	**1-8	1.00	168.0	0.00	1.0+00	24.00	070.00	0.07	000.00
165	**1-9	1.00	020.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
166	**1-10	1.00	026.1	0.00	1.0+00	0.00	1.0+00	0.00	000.00
167	**1-11	1.00	069.5	0.00	1.0+00	0.00	1.0+00	0.00	000.00
168	**1-12	1.00	147.1	0.00	1.0+00	0.00	1.0+00	0.00	007.00
169	**1-1	1.00	07.00	52.00	00.51	100.00	00.00	0.10	000.00
170	**1-2	1.00	050.2	0.00	1.0+00	0.00	1.0+00	1.00	000.00
171	**1-3	1.00	101.4	0.00	1.0+00	0.00	1.0+00	0.00	001.00
172	**1-4	1.00	143.5	0.00	1.0+00	0.00	1.0+00	1.71	000.00
173	**1-5	1.00	142.7	0.00	1.0+00	0.00	1.0+00	0.04	000.00
174	**1-6	1.00	011.7	0.00	1.0+00	0.00	1.0+00	0.00	000.00
175	**1-7	1.00	100.7	0.00	1.0+00	0.00	1.0+00	1.10	000.00
176	**1-8	1.00	174.1	0.00	1.0+00	0.00	1.0+00	1.00	000.00
177	**1-9	1.00	176.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
178	**1-10	1.00	021.7	0.00	1.0+00	0.00	1.0+00	1.00	000.00
179	**1-11	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
180	**1-12	1.00	165.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
181	**1-1	1.00	040.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
182	**1-2	1.00	151.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
183	**1-3	1.00	000.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
184	**1-4	1.00	007.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
185	**1-5	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
186	**1-6	1.00	110.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
187	**1-7	1.00	000.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
188	**1-8	1.00	177.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
189	**1-9	1.00	000.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
190	**1-10	1.00	000.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
191	**1-11	1.00	100.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
192	**1-12	1.00	100.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
193	**1-1	1.00	00.00	0.00	1.0+00	0.00	1.0+00	0.00	000.00
194	**1-2	1.00	140.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
195	**1-3	1.00	001.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
196	**1-4	1.00	04.00	0.00	1.0+00	0.00	1.0+00	0.00	000.00
197	**1-5	1.00	000.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
198	**1-6	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
199	**1-7	1.00	00.00	0.00	1.0+00	0.00	1.0+00	0.00	000.00
200	**1-8	1.00	100.0	0.00	1.0+00	72.00	00.70	0.07	000.00
201	**1-9	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
202	**1-10	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
203	**1-11	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
204	**1-12	1.00	170.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
205	**1-1	1.00	070.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
206	**1-2	1.00	147.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
207	**1-3	1.00	101.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
208	**1-4	1.00	000.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
209	**1-5	1.00	041.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
210	**1-6	1.00	000.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
211	**1-7	1.00	00.00	0.00	1.0+00	0.00	1.0+00	0.00	000.00
212	**1-8	1.00	100.0	0.00	1.0+00	0.00	1.0+00	1.00	000.00
213	**1-9	1.00	000.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
214	**1-10	1.00	000.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
215	**1-11	1.00	000.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
216	**1-12	1.00	000.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
217	**1-1	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
218	**1-2	1.00	000.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00
219	**1-3	1.00	100.0	0.00	1.0+00	0.00	1.0+00	0.00	000.00

SAM NO	POS	TIME MIN	IC#	WH		WIDE		LUMEX %	ELAPSED TIME
				QPM	% ERROR	QPM	% ERROR		
2206	*X-14	1.00	236.9	0.00	1.0+00	0.00	1.0+00	0.63	228.44
2207	*X-10	1.00	162.3	0.00	1.0+00	0.00	1.0+00	0.67	228.75
2208	*X-10	1.00	185.7	0.00	1.0+00	0.00	1.0+00	0.64	229.12
2209	*X-17	1.00	24.70	0.00	1.0+00	0.00	1.0+00	0.25	229.47
2210	*X-10	1.00	125.0	0.00	1.0+00	0.00	1.0+00	0.50	229.82
2211	*X-10	1.00	160.0	0.00	1.0+00	0.00	1.0+00	1.02	229.18
2212	*X-10	1.00	580.7	0.00	1.0+00	0.00	1.0+00	0.57	229.52
2213	*X-11	1.00	187.0	0.00	1.0+00	0.00	1.0+00	0.02	229.87
2214	*X-10	1.00	192.0	0.00	1.0+00	0.00	1.0+00	2.13	229.20
2215	*X-11	1.00	282.5	0.00	1.0+00	0.00	1.0+00	1.05	229.57
2216	*X-10	1.00	100.5	0.00	1.0+00	0.00	1.0+00	1.72	229.91
2217	*X-13	1.00	264.7	0.00	1.0+00	0.00	1.0+00	0.62	229.22
2218	*X-14	1.00	239.7	0.00	1.0+00	0.00	1.0+00	0.48	229.78
2219	*X-13	1.00	177.1	0.00	1.0+00	0.00	1.0+00	0.51	229.97
2220	*X-10	1.00	140.4	0.00	1.0+00	0.00	1.0+00	0.00	229.40
2221	*X-17	1.00	137.0	0.00	1.0+00	0.00	1.0+00	0.13	229.72
2222	*X-10	1.00	270.2	0.00	1.0+00	0.00	1.0+00	0.25	229.10
2223	*X-10	1.00	166.7	0.00	1.0+00	0.00	1.0+00	0.14	229.45
2224	*X-10	1.00	210.4	0.00	1.0+00	0.00	1.0+00	0.15	229.80
2225	*X-11	1.00	172.7	0.00	1.0+00	0.00	1.0+00	0.45	229.15
2226	*X-12	1.00	141.5	0.00	1.0+00	0.00	1.0+00	0.17	229.46
2227	*X-11	1.00	127.2	0.00	1.0+00	0.00	1.0+00	0.27	229.07
2228	*X-10	1.00	178.3	0.00	1.0+00	0.00	1.0+00	0.10	229.88
2229	*X-13	1.00	184.2	0.00	1.0+00	0.00	1.0+00	0.82	229.24
2230	*X-14	1.00	188.2	0.00	1.0+00	0.00	1.0+00	0.12	229.80
2231	*X-10	1.00	291.1	0.00	1.0+00	0.00	1.0+00	0.15	229.34
2232	*X-10	1.00	380.5	0.00	1.0+00	0.00	1.0+00	0.11	229.05
2233	*X-17	1.00	187.0	0.00	1.0+00	0.00	1.0+00	0.17	229.04
2234	*X-10	1.00	22.39	0.00	1.0+00	0.00	1.0+00	0.02	229.57
2235	*X-10	1.00	187.0	0.00	1.0+00	0.00	1.0+00	1.46	229.70
2236	*X-10	1.00	189.5	0.00	1.0+00	0.00	1.0+00	0.20	229.22
2237	*X-11	1.00	217.5	0.00	1.0+00	0.00	1.0+00	0.42	229.44
2238	*X-10	1.00	178.1	0.00	1.0+00	0.00	1.0+00	0.42	229.77
2239	*X-11	1.00	189.8	0.00	1.0+00	0.00	1.0+00	1.24	229.04
2240	*X-10	1.00	184.5	0.00	1.0+00	0.00	1.0+00	0.72	229.53
2241	*X-10	1.00	187.0	0.00	1.0+00	0.00	1.0+00	0.17	229.62
2242	*X-13	1.00	137.0	0.00	1.0+00	0.00	1.0+00	0.51	229.20

PAGE: 1

WIDE WINDOW OPERATIONAL

18 JUL 2005 16:32

```

USERID:                                COMMENT:
PRESET TIME : 1.00
DATA CALIB : OFF
COUNT CLAMP : NO
TWO PHASE : NO
SCINTILLATOR: LIQUID
IS. LEVEL : NO
SAMPLE REPEATS: 1
REAL CATES : 1
CYCLE REPEATS : 1
LOW SAMPLE RES: 0
CORRECT ION DATE: none
  
```

WIDE OPEN WINDOW %ERROR: 0.00 FACTOR: 1.240000 SKB. SUB: 0

SAM NO	POS	TIME MIN	HW	WIDE		LUMEX %	ELAPSED TIME
				CPM	%ERROR		
1	xx-1	1.00	1.3	61750.00	0.80	0.00	1.45
2	xx-2	1.00	1.4	98264.00	0.64	0.00	0.02

} STANDARDS

MIKE,

I HAVE LABELED ALL THE PAGES IN PEN , IN THE ORDER IN WHICH THEY SHOULD
BE READ. IT WOULD HAVE BEEN A LOT OF WORK TO GET ALL THE DIFFERENT
FILES IN ONE UNIT AND HAVE THE COMPUTER PAGE THEM CONSECUTIVELY.
BESIDES YOU MAY WANT TO CHANGE THE ORDER OR ELIMINATE SOME PAGES.

I HOPE THIS IS OKAY..

THANKS FOR ALL YOUR HELP.

BRO JEROME

JUL 20 2005