



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

MAR 1 1985

Oral Roberts University  
ATTN: Roger D. Hartman, Ph.D.  
Chairman, Radiation Safety Committee  
7777 South Lewis  
Tulsa, Oklahoma 74171

Gentlemen:

This refers to your letter dated February 5, 1985, for an amendment to Materials License 35-18282-01.

An amendment fee of \$120 is required as specified in §170.31 (7B) of 10 CFR 170, copy enclosed. Payment should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention at our Washington, D.C. address.

Your application will be processed by the Region IV Licensing staff located at 611 Ryan Plaza Drive, Suite 1000, Arlington, Texas 76011. The fee, however, is required prior to issuance of the amendment. When submitting the fee, please refer to CONTROL NUMBER 460534.

Sincerely,

A handwritten signature in cursive script, reading "Glenda Jackson", is written over the typed name.

Glenda Jackson  
License Fee Management Branch  
Office of Administration

Enclosure:  
10 CFR 170

cc: Region IV

8506120175 850425  
REG4 LIC30  
35-18282-01 PDR

INTEROFFICE MEMO

TO: Dr. Don Godfrey, Dr. Dave Ross  
FROM: Roger D. Hartman, Ph.D., Chairman, Radiation Safety Committee  
DATE: January 29, 1985  
SUBJ: Authorization to use Lowery System  
CC: Drs. Bond, Gilmore, Anderson, and Ms. Pruitt

Earlier today, the Radiation Safety Committee considered the report of the Ad Hoc Subcommittee, which reviewed your request to pipette microcurie amounts of C-14, using a Lowery type system.

After considerable discussion, the Committee approved your request, as follows:

1. Only three people, Dr. Don Godfrey, Dr. David Ross, and/or Katrina Baranek are approved to perform the procedures. Only these specified people will be allowed to use the apparatus. A written request for approval for someone new must be made with the Radiation Safety Committee and the new user must be interviewed by the RSO or his/her designee, and approved by the Committee.
2. Only C-14, in quantities not to exceed  $20\mu\text{Ci/wk}$ , will be utilized in the apparatus, in room(s) as specified in the "Regulations" attached hereto. Any change in isotope or quantity greater than  $20\mu\text{Ci/wk}$  must be requested in writing, and approved by the Radiation Safety Committee.
3. The apparatus and/or procedures, i.e., "regulations", will not be altered unless a written request to the Radiation Safety Committee has been approved. (Please note hand written comments on each page as dated 29 January 85 attached to this memo. These are the "official regulations".)
4. You agree to follow the current ORU/COF and NRC guidelines and regulations dealing with use of isotopes and hazardous materials, and to promptly report any incident to the Radiation Safety Office.
5. Permission for use of the apparatus and procedures on the ORU/COF premises can be rescinded at any time by a vote of the Radiation Safety Committee, if in the view of the Committee, violations are occurring or if it appears to be a health hazard.
6. Final authority to perform this technique rests in the hands of the NRC.

If you agree to these terms, please sign, date, and return one original set of papers to my office. Retain the others for your own records.

The Committee wishes to thank you for your assistance and cooperation during the site visit.

\_\_\_\_\_  
Dr. Don Godfrey

\_\_\_\_\_  
Date

\_\_\_\_\_  
Dr. David Ross

\_\_\_\_\_  
Date

\_\_\_\_\_  
Ms. Katrina Baranek

\_\_\_\_\_  
Date

## Pipetting System for Radiometric Assays

### 1. Description of system

The system consists of rubber tubing (3 millimeter inside diameter) with cellulose filters interposed. The glass micropipet is inserted into one end of the tubing. The filters are inserted into plastic holders to which the tubing is attached. There is about 0.1 meter of tubing between the filters and the pipet and about 1 meter of tubing between the filters and the mouthpiece.

The system is used for pipetting volumes of fluid less than about 100 microliters, often less than 1 microliter. Movement of these very small amounts of fluid is accomplished to a high degree of accuracy (less than 1% variation) by use of specially constructed glass or quartz micropipets and suction or expulsion under mouth control. Use of mouth control provides very fine control of small fluid movements and leaves hands free for other manipulations.

### 2. Use of the system

This pipetting system has been used for over 10 years by the investigators, first at Washington University Medical School in St. Louis, Missouri, then at Oral Roberts University in Tulsa, Oklahoma.

There has never been a single incident of fluid reaching the mouth of a person using the system. In fact, it is extremely rare that fluid ever enters the rubber tubing from the glass micropipet because the part of the pipet into and from which fluid moves is a relatively very small compartment near its tip. The main purpose of the filters is to protect the user from volatile solvents.

### 3. Application for radiometric assays

The system has been used extensively for 2 radiometric assays. Both involve carbon-14-labelled organic chemicals. Both involve addition of 5 or 10 microliters of aqueous incubation medium; one involves further addition of 1 microliter of substrate and 1 microliter of acid. Both involve addition of 40 or 70 microliters of an organic solvent, then removal of 30 or 60 microliters of the solvent. The assay is carried out in 400 microliter-capacity tapered polyethylene tubes, 4 millimeters diameter at the mouth and 2 millimeters diameter near the tip. The carbon-14 label is on acetyl coenzyme A, acetylcholine, or acetate during the assays. These are all non-volatile compounds.

The amount of carbon-14-labelled material added to each tube during the assay is about 0.025 microcurie. The amount removed in the last step of each assay is routinely less than 0.002 microcurie. Approximately 60 tubes are usually involved in a single total assay procedure.

*Append  
20 June 85  
L.B.K.*

#### 4. Monitoring of the system

Exposure of a user's mouth to radioactivity may be monitored by determining any counts on the mouthpiece in a scintillation vial, since no more radioactivity can reach the person's mouth than reaches the mouthpiece. As further checks, the filters or pieces of the rubber tubing may also be put into vials for counting. When this was most recently done, the following results were obtained for 5 such pipetting systems.

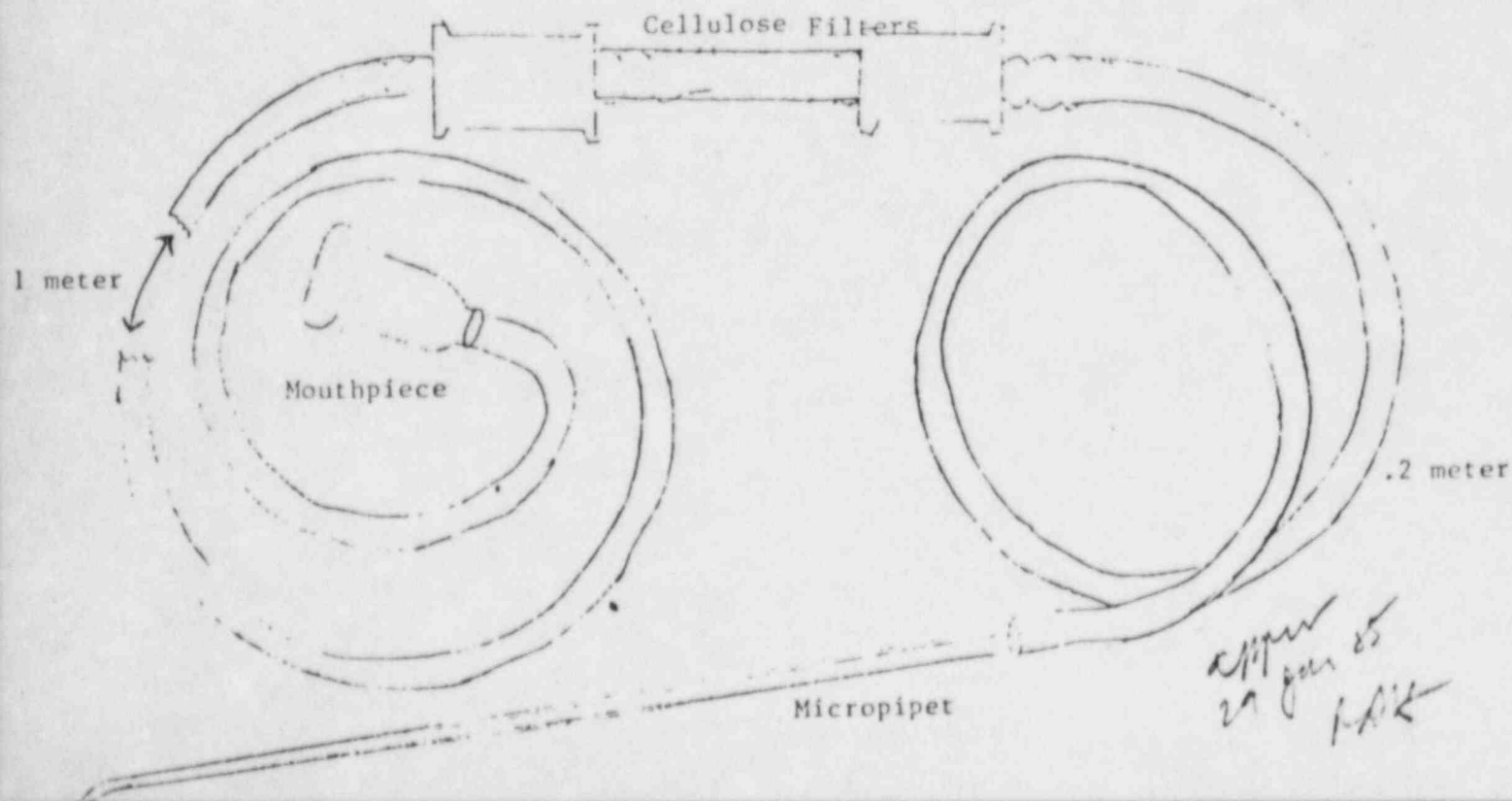
<u>item</u>	<u>counts per minute</u>	<u>picocuries (= microcuries x 0.000001)</u>
mouthpiece	0.5, 0.3, 1, 1, 0.4 (average 0.7)	0.2, 0.1, 0.5, 0.5, 0.2 (average 0.3)
filter	18, 107, 2, 0, 0 (average 25)	8, 48, 1, 0, 0 (average 7)
part of tubing where pipet is inserted	3, 70, 1299, 1980, 3 (average 671)	1, 31, 585, 892, 1 (average 302)

*Must include  
legal  
in  
case!*

#### 5. Alternative systems

Recently many mechanical pipetting systems have become available. Some of these are suitable for certain steps of assay procedures where high accuracy or very small volumes or use in confined spaces is not involved. So far, no system has proven adequate for all aspects of the radiometric assays.

(Sketch approximates actual size of pipetting system)



I. Location

All radioactive materials for biochemical assay will be stored and used only in Room 2C22.

II. Personnel

The only people who will perform assays with radioactive materials will be those personnel who:

1. Are knowledgeable in general lab safety, proper micropipetting techniques, the assay procedure, and safety in handling radioactive materials.
2. Are certified as to the above by the senior technician responsible for training and the lab supervisor (Dr. Godfrey or Dr. Ross)
3. Are registered by the RSO office for a radiation badge and have attended the (or will attend the next) radiation safety refresher course.
4. Not pregnant (if female).
5. Have signed the "Agreement to Perform Radiometric Assays" consent form.

III. Safety procedures for using radioactive materials in assays

Personnel using radioactive materials will:

1. Perform radioactive assays only in Room 2C22.
2. Conform to standard safety procedures.
3. Wear protective clothing and a radiation badge.
4. Perform appropriate monitoring of mouthpieces and filters and wipe tests of work areas.
- (c) Mouthpiece will be monitored each week that assays are done by placing it in 0.5 ml distilled water for 10 minutes, removing the mouthpiece, and placing the water in a scintillation vial for counting. Any counts above background will be reported to supervisor. Results of counting will be recorded in the log book *and signed by user and dated*
5. (b) Mouthpiece will be kept in a place remote to Room 2C22.
5. Keep records of radioactivity used with amounts and date *and signed by user*.
6. Report all radiation spills and other accidents immediately to the supervisor.

*Approved RSC  
29 Jan 85  
JAL*



#### IV. Amount of radioactivity

At present, the type of radioactive materials involves only  $^{14}\text{C}$ . The total amount of  $^{14}\text{C}$  radioactivity in a 60-tube assay is about 1.5 microcurie.

The total amount of  $^{14}\text{C}$  radioactivity that will be pipetted by all persons will not exceed 20 microcuries per week (although the average amount per week will be less than this).

The total amount of  $^{14}\text{C}$  radioactivity that will be pipetted by any one person will not exceed 10 microcuries per week (although the average amount per week will be less than this).

#### V. Risk

Personnel will understand and agree to the extremely small, albeit present, risk involved in pipetting small amounts of radioactivity materials with a remote mouthpiece and agree to conform to these lab regulations.

#### VI. In Case Liquid Containing Radioactivity Enters the Mouth

1. Do not swallow. Spit out mouth contents into sink. Rinse mouth with water at least 10 times.
2. Monitor inside of mouth by rubbing with cotton swab and counting the swab in scintillation counter.
3. Report incident to supervisor.

Approved  
29 Jan 85  
CCH

MAR 1 1985

Oral Roberts University  
ATTN: Roger D. Hartman, Ph.D.  
Chairman, Radiation Safety Committee  
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Sincerely,

Original Signed By  
Glenda Jackson

Glenda Jackson  
License Fee Management Branch  
Office of Administration

Enclosure:  
10 CFR 170

cc: Region IV

DISTRIBUTION:  
Pending Fee File  
Weekly Reading File  
Materials Reading File

OFFICE	LFMB:ADM	LFMB:ADM					
SURNAME	FBrown:rej	GJackson					
DATE	2/28/85	2/28/85					



FILE COPY

NRC FORM 218  
(4-76)  
NRCM 0240

U.S. NUCLEAR REGULATORY COMMISSION

DATE 4/29/85

TELEPHONE OR VERBAL CONVERSATION RECORD

TIME 8:45 ☒ A.M.  
☐ P.M.

☐ INCOMING CALL

☒ OUTGOING CALL

☐ VISIT

PERSON CALLING

OFFICE/ADDRESS

PHONE NUMBER

EXTENSION

PERSON CALLED

OFFICE/ADDRESS

PHONE NUMBER

EXTENSION

Roger Hartman, Ph.D.

City of Faith

918-43-8147

CONVERSATION

SUBJECT

Fees Problem

Log. No. 35-18282-01

SUMMARY

Talked to Dr. Hartman Secretary (Nancy) To leave message that action has been voided and to disregard Fee letter.

For Information Only as classification.

Review by RSC.

REFERRED TO:

ACTION REQUESTED

None required

☐ ADVISE ME OF ACTION TAKEN.

INITIALS

DATE

ACTION TAKEN

INITIALS

DATE