

OCT 11 1988

Docket No. : 030-01221  
License No.: 04-01935-03  
Control No.: 70804

Veterans Administration Medical Center  
2615 East Clinton Avenue  
Fresno, California 93703

Attention: Mr. Wayne Tippetts  
Hospital Director

Gentlemen:

Enclosed is the NRC license amendment which you requested.

Please review the enclosed document carefully and be sure that you understand all conditions. If there are any errors or questions, please notify us so that we can provide appropriate corrections and answers.

As 10 CFR 35.92 now authorizes decay-in-storage and as 10 CFR 35.50 allows the use of lineator sleeves for linearity testing, two conditions were deleted from your license. This does not alter the content of your license.

Any future correspondence relating to your license should specifically reference your license and docket numbers to expedite your inquiry.

Sincerely,

Beth A. Riedlinger  
Health Physicist (Licensing)  
Nuclear Materials Safety Section

Enclosure: Attachment A  
Amendment No. 42 to License No. 04-01935-03

9001240126 891011  
REG5 LIC30  
04-01935-03 PDR

RECEIVED  
OCT 19 1988  
ML 50

Distribution

bcc w/original concurrence, copy of license, and original correspondence:  
License docket folder (Peggy)

bcc w/copy of license and correspondence:  
Inspection folder (Peggy)

bcc w/copy of license:  
Reading file (Frances)

bcc w/correspondence and 2 copies of license:  
Maurice Messier, LFMB, MNBB 4503

license only:  
State of California

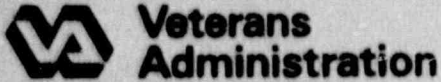
F. Browne  
/ /

J. Montgomery  
/ /

D. Skov  
/ /

<sup>FOR</sup>  
B. Riedlinger  
10/11/89

REQUEST COPY ]	REQUEST COPY ]	REQUEST COPY ]	REQUEST COPY ]	REQUEST COPY ]
YES / NO ]	YES / NO ]	YES / NO ]	YES / NO ]	YES / NO ]



00 JUL 5 9:42  
Reply Refer To:

570/115

June 19, 1989

U.S.N.R.C.  
Region V  
Attn: Beth A. Riedlinger  
1450 Maria Lane, Suite 210  
Walnut Creek, CA 94596

RE: Mail Control Number: 70804

SUBJ: Amendment to NRC Radioactive Materials License 04-01935-03; Xenon-133 Use

1. With reference to the previous request of June 22, 1988, we request a license amendment concerning the use of Xe-133.
2. Furthermore, the amendment requested will replace all previous amendments and license sections regarding the use of Xenon-133. Those past communications are listed by date below:

○ 6-22-88	Letter
○ 8-15-85	Letter and Amendment 36
○ 7-17-85	Letter
○ 2-06-84	Letter and Amendment 29
○ 1-05-84	Letter
10-31-83	Letter
○ 8-15-83	Letter

3. The assumptions for the use of Xe-133 are as follows:
  - a. 10 patients per month (2.5 patients per week average)
  - b. 7 mCi of Xe-133 per patient
  - c. 20% patient leakage to restricted work area.
  - d. 756 CFM air supplied (see map of vent locations and air flow rates).
  - e. 1358 CFM (supplemental hood vent exhaust rate).
  - f. 602 CFM negative differential air flow (756-1358).
  - g. fume hood "on" time of 7.5 hours/week (3 hours per patient).
4. Calculations using the assumptions in Part 3 above are shown below:

a.  $2.5 \text{ PATIENTS/WK} \times 7 \text{ mCi/PATIENT} \times 10^3 \text{ mCi/mCi} = 1.7 \times 10^4 \text{ } \mu\text{Ci/WK (A)}$   
 "America is #1—Thanks to our Veterans"

(Xe-133) USE 70804



U.S.N.R.C.  
Walnut Creek, CA

$$b. 602 \text{ CF/MIN} \times 2.83 \times 10^4 \text{ ml/CF} \times 7.5 \text{ HR 'FAN'/WK} \times 60 \text{ MIN/HR} =$$

$$= 7.7 \times 10^9 \text{ ml/WK (V)}$$

(AIR OUTFLOW)

$$c. \frac{1.7 \times 10^4 \text{ } \mu\text{Ci/WK} \times 0.20 \text{ LEAKAGE}}{7.7 \times 10^9 \text{ ml/WK}} = \frac{4.4 \times 10^{-7} \text{ } \mu\text{Ci/ml}}{\text{Xe-133 CONCENTRATION}} \text{ (C)}$$

Conclusion:  $4.4 \times 10^{-7} \text{ } \mu\text{Ci/ml}$  is less than the allowed  $1 \times 10^{-5} \text{ } \mu\text{Ci/ml}$  released Xe-133 to restricted areas.

5. A charcoal trap will be used such that only a Xe-133 trap leakage of 10% per week will be maximally released (10% of  $1.36 \times 10^3 \text{ } \mu\text{Ci}$  trapped per week) =  $1.36 \times 10^2 \text{ } \mu\text{Ci/week}$ . (MAX. RELEASED).

Thus, the concentration will be

$$\frac{1.36 \times 10^3 \text{ } \mu\text{Ci/WK}}{7.7 \times 10^9 \text{ ml/WK}} = 1.77 \times 10^{-7} \text{ } \mu\text{Ci/ml}$$

which is less than the allowed  $1.5 \times 10^{-5} \text{ } \mu\text{Ci/ml}$  in restricted areas.

6. The trap will be monitored initially and quarterly for trapping efficiency by collecting the effluent in a plastic bag during one patient study (or simulated study) and comparing the collected activity to the background activity. Also, a known amount of Xe-133 will be ejected into a plastic bag and then the bag activity will be measured. When the trap releases more than 2.3 mCi per week, then the trap will be replaced. An exhaust hose will connect the trap exhaust port and the fume hood such that the trap leakage is directed to the outside hood vent. A record of the date, background and bag activities in cpm will be kept.

7. Spilled gas clearance time (minimum) is determined by the following calculations:

$$t = \frac{\text{ROOM VOLUME}}{\text{EXHAUST RATE}} \cdot \ln \frac{\text{MAX. PERMIT. CONC.}}{\text{(RESTRICTED AREA) GAS ACT.}} =$$

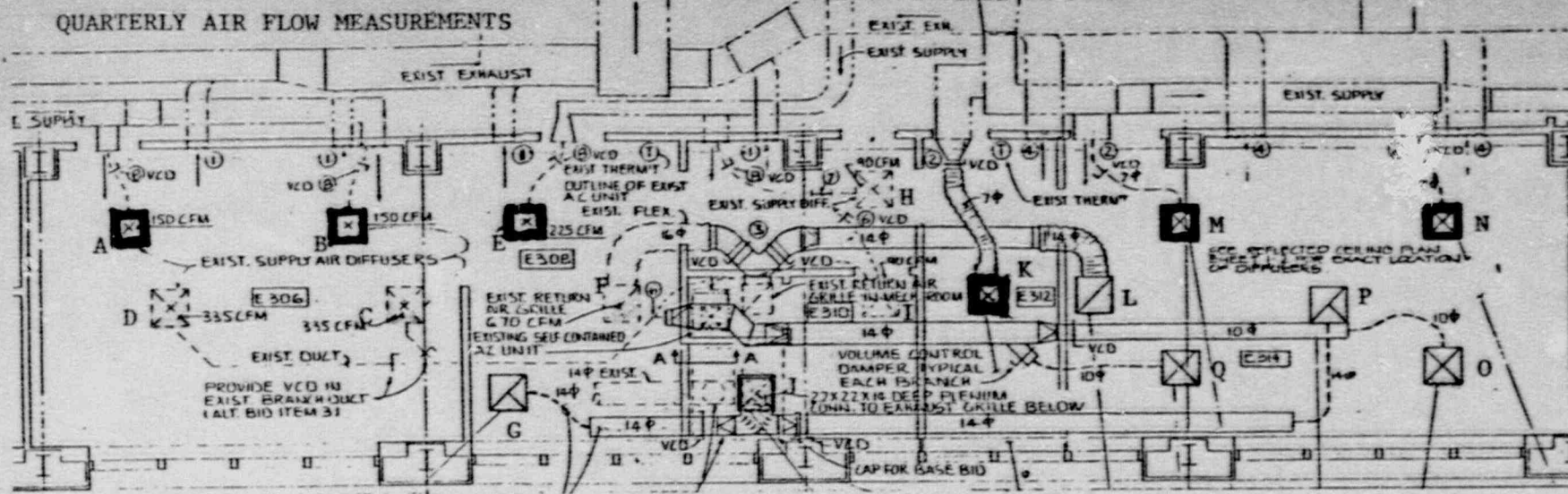
$$= \frac{464 \text{ CF}}{1358 \text{ CF/MIN}} \times \ln \frac{1 \times 10^{-5} \text{ } \mu\text{Ci/ml}}{7000 \text{ } \mu\text{Ci}} \times \frac{464 \text{ CF}}{7000 \text{ } \mu\text{Ci}} \times 2.83 \times 10^4 \frac{\text{ml}}{\text{CF}}$$

$$= 1.4 \text{ MIN}$$

The room will be cleared of personnel for a period of 5 minutes. This clearance time will be posted within the room.

*Donald E. Holmes, Ph.D.*  
Donald E. Holmes, Ph.D.

QUARTERLY AIR FLOW MEASUREMENTS

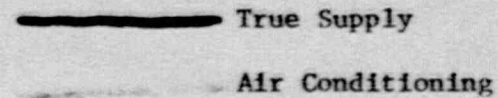


NUCLEAR MEDICINE FACILITY

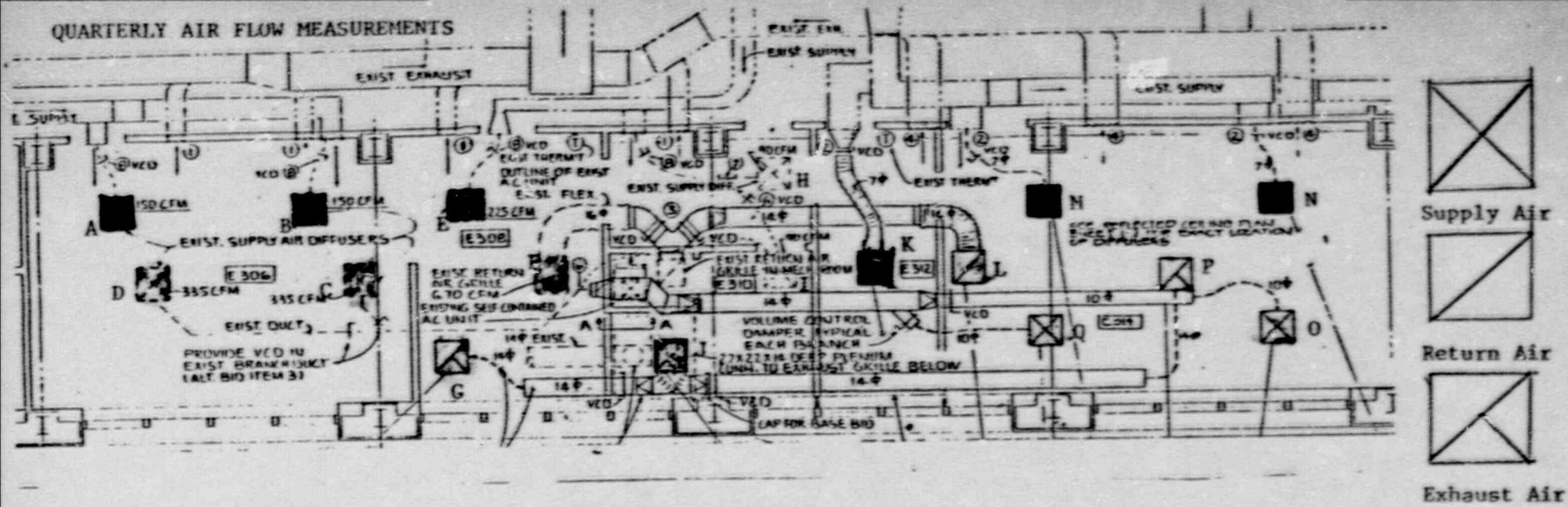
date \_\_\_\_\_

Linear Flow Rates (fpm)

- |    |    |
|----|----|
| A. | I. |
| B. | J. |
| C. | K. |
| D. | L. |
| E. | M. |
| F. | N. |
| G. | O. |
| H. | P. |
|    | Q. |



QUARTERLY AIR FLOW MEASUREMENTS



NUCLEAR MEDICINE FACILITY

date \_\_\_\_\_

Linear Flow Rates (fpm)

- |    |    |
|----|----|
| A. | I. |
| B. | J. |
| C. | K. |
| D. | L. |
| E. | M. |
| F. | N. |
| G. | O. |
| H. | P. |
|    | Q. |

— True Supply

• Air Conditioning





UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION V

1420 MARIA LANE, SUITE 210  
WALNUT CREEK, CALIFORNIA 94596-8003

MAR 17 1989

MEMORANDUM FOR: File  
License No.: 04-01935-03  
Docket No.: 030-01221  
Veterans Administration Medical Center  
Fresno, California

FROM: Beth A. Riedlinger  
Health Physicist (Licensing)

SUBJECT: PRE-LICENSING VISIT HELD ON MARCH 2, 1989

On March 2, 1989, R. D. Thomas and I visited the Veterans Administration Medical Center, Fresno, California, to discuss an amendment request regarding the use of xenon 133 (Control No. 70804).

The entrance interview was held with Mr. Wayne Tippets, the new Hospital Director. We explained that our purpose was to see the facility, issue a meaningful technically correct amendment, and to delete unnecessary paperwork from the license.

We then met with Dr. Vishnu Bobba, Chief, Nuclear Medicine, and with Dr. Donald Holmes, Radiation Safety Officer.

We toured the nuclear medicine imaging area. Several rooms are connected to make up the imaging area. Inner doors are open, but doorways to the hall are normally closed and locked. Exhaust vents which used to connect to the hospital system have been closed off completely. There is an air conditioning system which recirculates the air within the imaging area. The system is dedicated to that area - air is not distributed to other rooms. Vents used with the air conditioning system are noted as D, C, G, F, L, Q, P, and O on the attached blueprint drawing (Figure 1).

Vents A, B, E, H, I, K, M, and N are all supply vents. All vents have a 1.4 square foot cross-sectional area. Flow rates as measured by the RSO are given below:

Vent	Linear flow rate	CFM
A	80 lfpm	112
B	80	112
E	90	126
H	80	112
I	blocked off	--
K	70	98
M	70	98
N	80	98
Total Supply:		756 cfm

There is a fume hood in the hot laboratory which has a linear flow rate of 140 lfpm. The sash opening has an area of 9.7 square feet, for a 1358 cubic foot per minute air flow. The fume hood vents to the roof of the facility. Air intakes are located on the sides of the facility, not on the roof. The normal wind direction (NW) would blow the xenon 133 effluent away from the air intakes.

With the fume hood running, the imaging area is under negative pressure with a net exhaust of 602 cubic feet per minute.

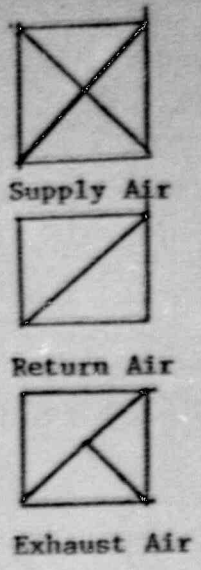
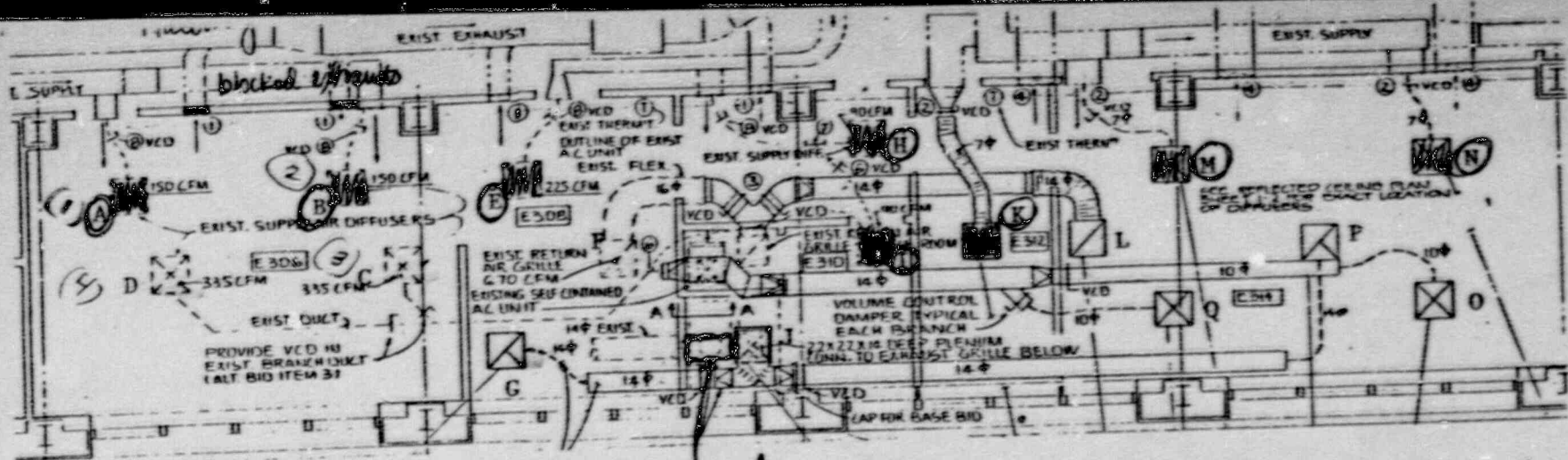
Calculations performed onsite are attached as Appendix A to this memo. They indicated that the licensee needs a charcoal trap with the xenon system in order to meet the limits for unrestricted areas which are stated in 10 CFR Part 20.

The licensee agreed to recalculate xenon concentrations and take another look at the length of time needed to run the fume hood during and after each study. They will also calculate the spilled gas clearance time and request that unnecessary documents be deleted from License Condition 17.

We stated that Dr. Tanida's name will be deleted from License Condition 12. when Amendment No. 42 is issued. The licensee requested this change in a letter dated March 22, 1988.

*Beth A. Riedlinger*  
Beth A. Riedlinger  
Health Physicist (Licensing)





date \_\_\_\_\_

NUCLEAR MEDICINE FACILITY

all vents are  $1.4 \text{ ft}^2$  ( $8^\circ$  diameter)

Linear Flow Rates (fpm)

- |            |          |            |    |    |            |    |             |    |           |    |           |           |    |    |    |
|------------|----------|------------|----|----|------------|----|-------------|----|-----------|----|-----------|-----------|----|----|----|
| Dem values | A 80 fpm | B 80 / 112 | C. | D. | E 90 / 126 | F. | G. 80 / 112 | J. | K 70 / 98 | L. | M 70 / 98 | N 80 / 98 | O. | P. | Q. |
|------------|----------|------------|----|----|------------|----|-------------|----|-----------|----|-----------|-----------|----|----|----|

blocked off

Hood:  $140 \text{ fpm} \times 9.7 \text{ ft}^2 = 1358 \text{ cfm}$

$1358 - 756 = 602 \text{ cfm}$   
 $(8.97 \times 10^{12} \text{ ml/yr})$

negative pressure

true supply  
 air conditioning  
 for nuclear  
 medicine  
 area

$756 \text{ cfm} = \text{total supply}$

Figure 1 V.A. Fresno Imaging Area

## Appendix A

Calculation of Xenon-133 Concentrations to  
Unrestricted Areas - V.A. Fresno.

License 04-01935-03

Control No. 70804

2.5 patients/week

7.0 millicuries /patient

$f = .20$

Fan is on for 3 hrs./patient (or 7.5 hrs/wk)

$$(602 \text{ cfm}) (2.83 \times 10^4 \frac{\text{ml}}{\text{cfm}}) (\frac{7.5 \text{ hrs}}{\text{wk}}) (\frac{60 \text{ min}}{\text{hr}}) \approx 7.7 \times 10^9 \frac{\text{ml}}{\text{wk}}$$

$$\frac{2.5 \text{ patients}}{\text{wk}} \times \frac{7 \text{ mCi}}{\text{patient}} \times 10^3 \frac{\mu\text{Ci}}{\text{mCi}} = 1.7 \times 10^4 \mu\text{Ci}/\text{wk} = A$$

$$C = \frac{A \times f}{V} = \frac{(1.7 \times 10^4 \mu\text{Ci}/\text{wk})(.20)}{7.7 \times 10^9 \text{ ml}/\text{wk}} = \boxed{4.4 \times 10^{-7} \mu\text{Ci}/\text{ml}}$$

per week

The unrestricted area limit for xenon-133 is  $3 \times 10^{-7} \mu\text{Ci}/\text{ml}$ . The VA Fresno is slightly above the limit. The fume-hood on-time will be revised to correct this situation.

NOV 18 1988

Docket No. : 030-01221  
License No.: 04-01935-03  
Control No.: 70804

V. A. Medical Center  
2615 East Clinton Avenue  
Fresno, California 93703

Attention: Mr. Lawrence C. Stewart  
Director

Gentlemen:

This is in reference to your request dated June 22, 1988 for amendment of your byproduct material license.

The use of Xenon-133 at your facility was previously described in letters dated August 16, 1985, July 17, 1985, and August 15, 1983 (the latter was referenced in your latest submittal). Based upon a review of those submittals, we have several concerns, which are described below.

1. In previous submittals, it was assumed that the fume hood would be in the full-open position. If xenon is vented to the roof from the fume hood, the fume hood should not be in the full-open position. Describe how xenon will be released in the fume hood. Submit calculations to demonstrate that concentrations released to unrestricted areas will not exceed  $3 \times 10^{-7}$  microcuries per milliliter.
2. It is not clear that there is negative pressure in the imaging area where xenon-133 is administered. You should submit current air balance data for this room and indicate the estimated activity lost in this area per study (since xenon traps will no longer be used). Also, you should submit calculations to show that concentrations in restricted areas will not exceed  $1 \times 10^{-5}$  microcuries per milliliter. You should also confirm that the air handling systems in the imaging room do not internally recirculate the air. Or, if air is recirculated, estimate the fraction of xenon-133 which may be mixed with the recirculated air and demonstrate that concentrations in unrestricted areas will not exceed  $3 \times 10^{-7}$  microcuries per milliliter in unrestricted areas.
3. You should confirm that the ventilation rates in xenon-133 use areas shall be measured every six months as required by 10 CFR 35.205(e). You should also specify that the calculations and safety measures described in 10 CFR 35.205(c) and (d) will be established and posted as required.

You will be contacted in the near future for a meeting between the licensing staff and your engineering people to discuss the ventilation system associated with your xenon-133 areas.



NOV 18 1985

V. A. Medical Center, Fresno

-2-

We will continue the review of your amendment request upon receipt of this information. In order to continue prompt review of your application, we request that you submit your response to this letter within 30 calendar days from the date of this letter. Please reply in duplicate, and refer to Mail Control No. 70804.

Sincerely,

Beth A. Riedlinger  
Health Physicist (Licensing)  
Nuclear Materials Safety Section

Enclosures:

Letter dated August 16, 1985

Letter dated July 17, 1985

Medical Center

*Carroll*  
2615 East Clinton Avenue  
Fresno CA 93703



**Veterans  
Administration**

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NRC  
REGION V

83 JUL 18 P12:43

In Reply Refer To: 570/115

June 22, 1988

U.S. Nuclear Regulatory Commission  
Materials Licensing Branch  
Washington, D.C. 20555

THRU: Director, Nuclear Medicine Service  
Veterans Administration Central Office  
Department of Medicine and Surgery  
Washington, D.C. 20420

*D/W 030-01221*

SUBJ: Amendment to NRC Radioactive Materials License #04-01935-03

1. The Nuclear Medicine Clinic has an air supply/circulation/exhaust system that is independent of the hospital's return air.
2. All exhaust is to the roof vent from the exhaust hood which is in the Radiopharmacy.
3. As previously calculated (see Amendment #29 RE: Letter of August 15, 1983), the necessary area ventilation is 170 cfm.
4. An amendment is requested such that the Xe-133 exhaust can be directed through the roof vent. At the maximum projected patient load of five patients per week at 10 mCi/patient, the weekly Xe-133 vent ejection will be 50 mCi. The Xe-133 losses into the imaging room will remain as previously estimated. The Xe-133 trap will not be used or monitored.

*Lawrence C. Stewart*  
LAWRENCE C. STEWART  
Director

*James W. Fletcher* 7/13/88  
JAMES W. FLETCHER, M.D.  
Director, Nuclear Medicine Service (114)  
Veterans Administration  
Washington, DC 20420

FEE EXEMPT

*70804*

APR 11 1988

Docket No. : 030-01221  
License No.: 04-01935-03  
Control No.: 70610

V. A. Medical Center

2615 East Clinton Avenue  
Fresno, California 93703

Attention: Mr. Laurence C. Stewart  
Director

Gentlemen:

This will acknowledge receipt of your letter dated March 22, 1988. Your license does not need to be amended at this time. The change which you reported has been placed in your official file and will be incorporated the next time an amendment is required pursuant to 10 CFR 35.13.

Sincerely,

Beth A. Riedlinger  
Health Physicist (Licensing)  
Nuclear Materials Safety Section

RV *BAR*  
RIEDLINGER  
4 11 1988





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NRC  
REGION V

030-01221

March 22, 1988

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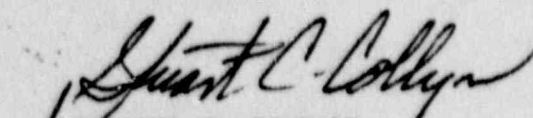
In Reply Refer To: 570/115

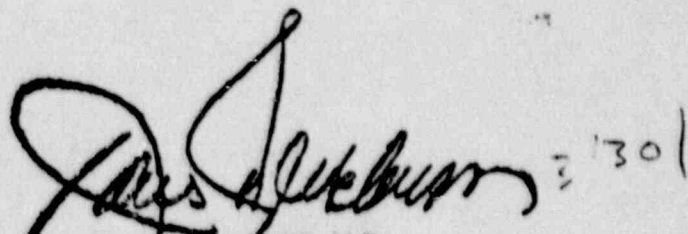
U.S. Nuclear Regulatory Commission  
Materials Licensing Branch  
Washington, D.C. 20555

THRU: Director, Nuclear Medicine Service (115)  
Veterans Administration Central Office  
Department of Medicine and Surgery  
Washington, D.C. 20420

SUBJ: Amendment of the NRC License #04-01935-03: Deletion of user  
Ryosaku Tanida, M.D.

1. Delete user Ryosaku Tanida, M.D. from License 04-01935-03, who has  
retired from VAMC-Fresno.

  
LAWRENCE C. STEWART  
Director

  
JAMES W. FLETCHER, M.D.  
Director, Nuclear Medicine Service (115)  
Veterans Administration  
Washington, DC 20420

FEE EXEMPT