Medical Center Salt Lake City UT 84148

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Veterans Administration

19 February 1988

In Reply Refer To: 660/115

U.S. NUCLEAR REGULATORY COMMISSION
6111 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

Attention: C. L. Cain, Chief
Nuclear Materials Licensing Section

Subject: License No. 43-03299-01 Control No. 461804

Gentlemen:

The following information is submitted in support of our application for a license amendment to permit incineration of animal carcasses, animal excreta, combustible animal bedding material, or other biological wastes that may be contaminated with radioactive materials. These materials will be burned in the pathological incinerator currently used for non-radioactive animal wastes and for special radioactive wastes as permitted by 10 CFR 20.306(b).

1. Site and Incinerator Characteristics

The incinerator is a dual chamber model with the lower chamber operating in the range of 700 to 2200°F and the upper chamber operating between 1000 and 2200°F. It is located in the east end of Bldg. 6 as indicated on the attached map. The rated airflow through the incinerator ranges from 2,000 to 3,800 cubic feet per minute during operation. Please note that the lowest airflow maintained during operation, i.e. 2000 cfm, is used in the dilution calculations. The stack is on top of the building, extending 37 feet above the roof. The nearest building air intake is on the north side of the west end of Bldg. 6, 110 feet away (see map).

461804

2. Isotopes and Quantities to be Incinerated

This request is for authorization to incinerate any nuclide with atomic number less than or equal to 83 in any quantity that cannot result in a 24-hour average concentration at the point of release in excess of the values listed in 10 CFR 20, Appendix B, Table II, Column 1. The method of calculation to determine this limit for any nuclide is indicated below.

3. Determination of Concentrations in Effluent

Since the incinerator stack extends 37 feet above the roof of the building and has no built-in provisions for stack gas sampling, direct stack sampling would be prohibitive. We propose to limit the release of radioactive materials to the atmosphere by assuming that all of the radioactivity in the incinerated materials is released via the stack rather than depending on actual concentration measurements in the stack. We will use the lowest operational flow rate of 2,000 cubic feet per minute for calculating the average concentration in the stack effluent. The 24-hour average concentration of a nuclide in the effluent is conservatively assumed to be:

$$C\ (\mu Ci/mL) = \frac{\text{activity in the materials incinerated (microcuries)}}{(2000\ ft^3/min)\ (28{,}320\ mL/ft^3)\ (1440\ min/day)}$$

For each nuclide, the concentration ratio is the concentration of that nuclide in the stack effluent, as calculated above, divided by the smallest concentration limit for that nuclide in an unrestricted area as listed in 10 CFR 20, Appendix B, Table II, Column 1, i.e. without determining whether the material in the stack effluent would be "soluble" or "insoluble".

The sum of the ratios for all nuclides in the materials to be burned on any one day will be calculated, and limited to a value of less than 1.

Example of calculation:
Assume that animal wastes to be burned on one day contain 200 µCi S-35, 30 µCi Ca-45 and 400 µCi Fe-55. The 24-hour concentration of these nuclides in the stack effluent would be 2.45×10^{-9}, 3.68×10^{-10} and 4.90×10^{-9} µCi/mL, respectively. The smallest values of the concentration limits for these nuclides are 9×10^{-9}, 1×10^{-9} and 3×10^{-8} µCi/mL, respectively, resulting in concentration ratios of 0.27, 0.37 and 0.16, respectively. The sum of the ratios would be 0.8, indicating that this burn would be acceptable.

Calculation of concentrations in liquid effluents is not applicable since the system includes no scrubber or condenser to produce liquid effluents.

4. Maximum Number of Burns

There will be no more than one burn of radioactive materials in any week, and no more than 30 burns in any year. Since each burn will be within the concentration limits of 10 CFR 20, Appendix B, the annual average will obviously be less than 30/365, or less than 10 percent of the regulatory, which meets the NRC's unique definition of ALARA.

5. Calculation of Concentration in Ash

For purposes of controlling the disposal of radioactive materials, we will make the most conservative assumption with regard to the concentration in the ash, i.e. we assume that all the activity is retained in the ash.

6. Procedures

a. There no special instructions or procedures for handling the materials to be incinerated, since they are no different in radiation risk than all of the other radioactive wastes that are collected and packaged by the same radiation safety technician.

b. Prior to each burn, each package of animal waste will be surveyed with a sensitive instrument (e.g. a GM survey meter) to verify that the reported activity is reasonable. The reported activity will also be checked against the investigator's records of use. The sum of the ratios of concentration limits will be calculated as described in 3. above.

c. Prior to each burn of radioactive materials, the ash from previous (non-radioactive) burns will be removed to reduce the volume of ash to be handled as radioactive waste.

d. After each burn of radioactive materials, the incinerator will be allowed to cool before removing the ash. The radiation safety technician who removes the ash will wear a laboratory coat, gloves, and a dust respirator, only as a precautionary measure. The technician is instructed to scoop the ash out carefully and to place it in a metal can. The residual ash is to be removed with a vacuum cleaner with a disposable bag. Experience with this procedure at another incinerator (University of Utah) for several years has proven it to be safe and effective.

Lack of exposure to this individual will be verified by routine bioassays.

e. The ash is packaged for disposal as low-level radioactive waste for disposal at a licensed facility.

A letter from Mr. Larry F. Anderson, Director, Utah Bureau of Radiation Comtrol, regarding this application is attached. If you have questions concerning this amendment request, please contact our radiation safety officer, Dr. Keith Schiager at 801-581-6141 (University of Utah Radiological Health Department).

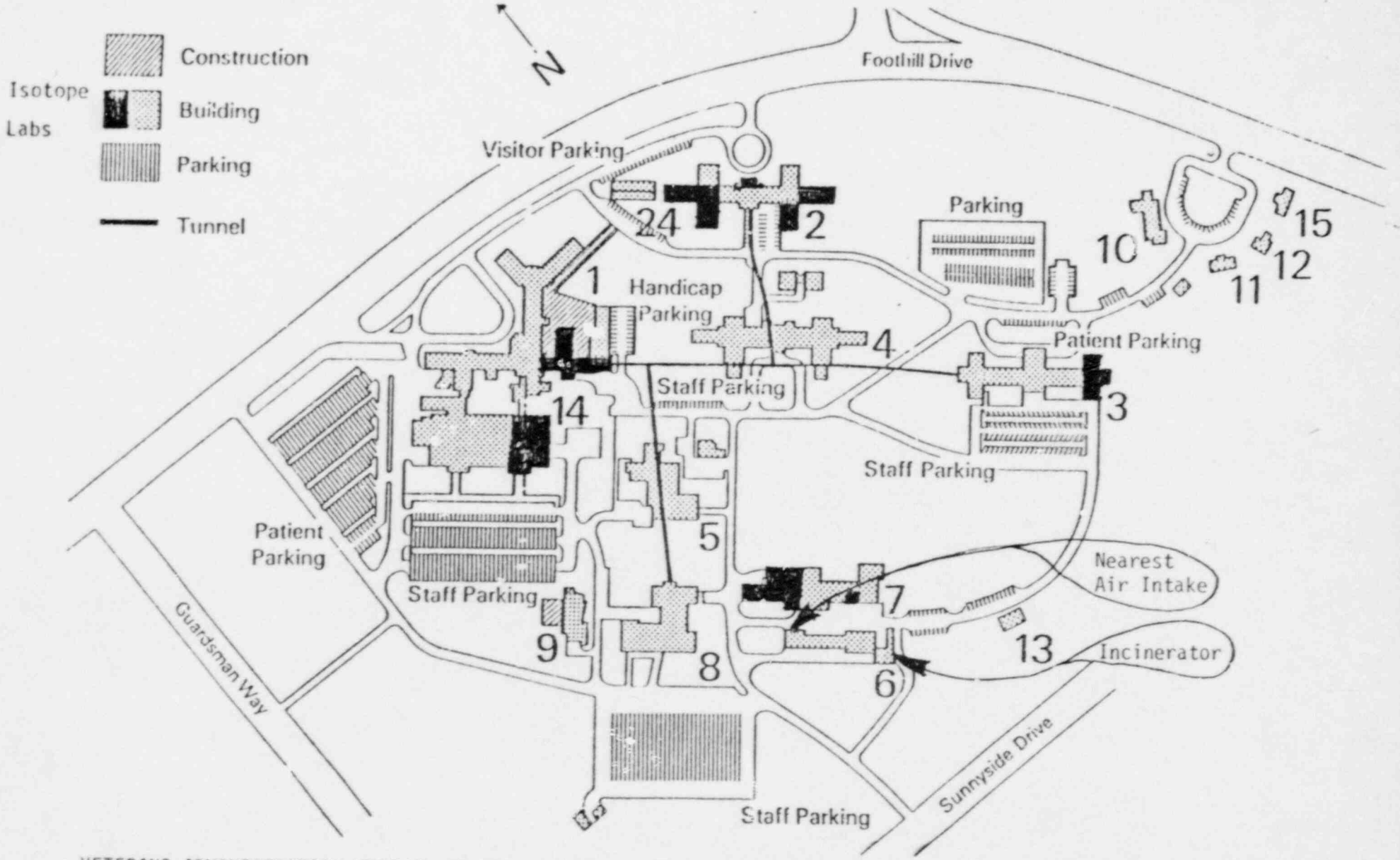
Sincerely,

W. L. Hodson
Medical Center Director

Attachments: VAMC map showing incinerator location and nearest building air intake.

Letter from Larry F. Anderson, Utah Bureau of Radiation Control, dated February 9, 1988.

cc: Veterans Administration Central Office
ATTN: Helen Malaskiewicz
Nuclear Medicine Service (115)
810 Vermont Avenue, N.W.
Washington, DC 20420



VETERANS ADMINISTRATION MEDICAL CENTER, 500 Foothill Drive, Salt Lake City, Utah 84148

Norman H. Bangerter
Governor

Suzanne Dandoy, M.D., M.P.H.
Executive Director

FEB 16 1988

February 9, 1988

Veterans Administration Medical Center
ATTN: Mr. W. L. Hodson
Medical Center Director
500 Foothill Drive
Salt Lake City, Utah 84148

Dear Mr. Hodson:

This is in reference to your amendment request to the U. S. Nuclear Regulatory Commission for authorization to incinerate waste containing byproduct material at the Veterans Administration Medical Center. Plans and specifications for your proposal to use your existing pathological incinerator have been found to be consistent with the Utah Radiation Control Regulations. We offer no objections to this technique for reduction of waste volume.

If you desire additional information regarding this determination, please contact me at 538-6746.

Sincerely,

Larry F. Anderson, Director
Bureau of Radiation Control

cc: Burnell Cordner, Director
Bureau of Air Quality
Dr. Keith Schiager, Radiation Safety Officer
V.A. Medical Center

Kenneth L. Alkema, Director • Division of Environmental Health
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