INSTITUTE OF ARCTIC BIOLOGY

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May 5, 1970

U. S. Atomic Energy Commission
Isotopes Branch
Division of Material Licensing
Washington, D.C. 20545

Attention: John E. Bowyer

Gentlemen:

I am requesting the following amendments to U.S. AEC By-Products and Material License #50-02430-07. The first amendment concerning the addition of the Arctic Health Research Center, College, Alaska to license #50-02430-07. This amendment was requested in an earlier letter to Isotopes Branch, U.S. AEC signed Dan Holleman, Ph.D. (February 19, 1970) however additional information was needed. I hope the enclosed information will suffice.

(a) Alter address at which By-Product Materials will be used to include the Arctic Health Research Center (AHRC) rooms 130 and 161 only.

A nuclear Chicago Survey Meter, Model 2652, with an end window proble (mica window - 1.5 to 2.0 mg/cm^2) will be available in the AHRC laboratory where radioisotopes are to be used. All instrumentation at the Institute of Arctic Biology is also available to Dr. Philip since she has a joint appointment between the two Institutes. This instrumentation was enumerated on Application for By-Product Material License, which resulted in AEC License #50-02430-07 signed by Peter Morrison, Ph.D.

A description of the facilities and a summary of the proposed experimental program at AHRC was discussed in a letter to Dan Holleman from Betty Anne Philip, Ph.D., dated May 4, 1970. A copy of this letter is enclosed.

(b) Add the following radioisotopes to item #6 of Form AEC - 374.

By-Product Material	Chemical and/or Physical Form	Maximum Amount
Cerium - 144	Any	5 millicuries
Cerium - 141	Any	50 millicuries

These isotopes will be used in tracer studies in laboratory animals and metabolic studies of reindeer and caribou.

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Tracer studies with these radioisotopes (Ce-141 and Ce-144) at the Cantwell Field site will be conducted under the general conditions for field use of radioisotopes outline under license #50-02430-07, Amendment No. 5. A review of accepted proposal is as follows: Only one radioisotope experiment per year will be conducted on each grazing plot of 100 feet radius.

Appropriate calculations for Ce-141 and Ce-144 are as follows:

1) Grazing allotment (100' radius) per experiment 3.14×10^4 feet^2.

2) Annual rainfall 22.2".

3) Dilution volume per grazing allotment (1.6×10^6 liters).

4) Dose per animal 20 microcuries.

5) Resulting isotope concentration if all eliminated from the animal and neglecting physical decay:

1.3×10^{-5} microcuries/liter
1.3×10^{-8} microcuries/ml

Values from Table II, Appendix B, Part 20, Title 10, U.S. AEC Rules and Regulations:

Ce-141	9×10^{-5} µCi/ml
Ce-144	1×10^{-5} µCi/ml

Ratio of maximum annual concentration to permissible concentration for unrestricted areas (neglecting physical decay).

$$\text{Ce-141} \quad \frac{1.3 \times 10^{-8}}{9 \times 10^{-5}} = \frac{1}{7000}$$

$$\text{Ce-144} \quad \frac{1.3 \times 10^{-8}}{1 \times 10^{-5}} = \frac{1}{700}$$

(c) The trituim (^{3}H) dose per animal approved for use at the Cantwell Field site was 140 microcuries (Amendment NO. 5, License #50-02430-07 and letter dated June 10, 1968 signed by Jack R. Luick, Ph.D.). The dose has been found to be insufficient for accurate determination of total body water and water turnover in reindeer. We wish to increase the dose to a maximum of 3 millicuries. Under the same conditions as amendment (B) of this letter, the ratio of maximum annual concentration to permissible concentration for

unrestricted areas would be (for a tritiated water dose of 3 millicurie):

$$\frac{1.8 \times 10^{-6}\ \mu Ci/ml}{3 \times 10^{-3}\ \mu Ci/ml} = \frac{1}{1700}$$

Sincerely yours,

Dan Holleman

Dan Holleman, Ph.D.

DH/lp