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United States
Department of
Agriculture

Agricultural
Research
Service

Radiological
Safety
Staff

6303 Ivy Lane
Greenbelt, Maryland
20770-1433

JUN 27 1991

John D. Kinneman
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, Pennsylvania 19406

Dear Mr. Kinneman:

This is a request for burial of radioactive material under 10 CFR 20.302. Frederick F. Knowlton, Leader, Ecological and Behavioral Applications Project, APHIS, conducted an experiment earlier this year under the Utah State University (USU) license with reciprocity from the State of New Mexico at the USDA, ARS, Jornada Experimental Range in Las Cruces, New Mexico. The reciprocity agreement was rescinded by the State of New Mexico on May 10, 1991. Through discussions with Frank Costello, of your office, we understand that any continuing activities associated with this experiment are considered USDA licensed activities under the USDA U.S. Nuclear Regulatory Commission License No. 19-00915-03.

The enclosed letter from Dr. Knowlton, describes the radioactive materials he has buried at the Jornada Experimental Range as a result of the experiment. He also describes the hydrogeological characteristics and security of the burial site. The USDA Radiological Safety Staff has determined that, because of the short half-lives of the radioisotopes and the distance of the materials to the water table, the material is not likely to migrate from the burial site and the burial is not likely to result in exposures to individuals living in the surrounding area. The USDA will control access to the burial site for at least 6 half-lives (approximately 12 years) at which time there will be approximately one microcurie of cesium-134 remaining.

If you have any questions or if our understandings are incorrect, please contact me on FTS 344-0193.

Sincerely,

John T. Jensen
Director

Enclosure

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United States
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Agriculture

Animal and
Plant Health
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Service

Science and
Technology

Denver Wildlife Research C.
Building 16, P.O. Box 2826
Denver Federal Center
Denver, CO 80226-0266

ECOLOGICAL AND BEHAVIORAL APPLICATIONS PROJECT
USDA/APHIS/S&T/DWRC
UTAH STATE UNIVERSITY
LOGAN, UTAH 84322-5295

TO: John Jensen, Radiological Safety Office, USDA/ARS,
Greenbelt, Maryland 20703

FROM: Leader, Ecological and Behavioral Applications Project,
USDA/APHIS/S&T/DWRC, Utah State University, Logan, Utah

DATE: June 6, 1991

SUBJECT: Request for burial of radioactive materials

The following information is submitted in support of a request to bury a small quantity of radioactive materials on the USDA Jornada Experimental Range:

Location: USDA/ARS, Jornada Experimental Range
Dona Ana County, New Mexico

Description of situation:

Pit: 5' wide, 30' long, and 8' deep. Materials will be buried with a minimum of 6' of overburden.

Fence: An area 40' by 80' around the pit will be fenced with metal "T" posts at 10-foot intervals with braces in 2 directions at each of the 4 corners. Four strands of barbed wire with no gates will be attached to the outside of the posts. Metal signs 8" x 12" with the radiation logo and "Radioactive materials" clearly visible will be securely attached to the fence on each of the four sides of the enclosure.

Hydro-geology: The area is in the sandy dune area on the eastern side of the Jornada Experimental Range. The water table in this vicinity is about 400' below the surface (based on a windmill driven well 2 miles to the east). A 10-12" layer of caliche (calcium carbonate layer above which evaporation exceeds percolation) is located 4' below the surface and some 2-3 feet above the buried materials. Leaching of materials should be negligible because of the arid nature of the environment and the layer of caliche.

Request for isotope burial

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Form of materials: Biologic materials comprised of:

- 48 adult Angora goats (est. wt. = 2,400 lbs)
- 20 kid goats (est. wt. = 150 lbs)
- 40 adult coyotes (est. wt. = 1,000 lbs)

Isotopes:

Isotope	Estimated in uCi		
	Goats	Coyotes	Total
⁵⁴ Mn	- -	7.2	7.2
⁶⁵ Zn	93.2	5.2	98.4
¹²⁵ I	- -	71.0	71.0
¹³⁴ Cs	81.0	5.0	86.0

Estimates of quantities made on the basis of following calculations:

Adult goats:

- Each marking collar = 2 reservoirs with 15 uCi ¹³⁴Cs each.
- 38 collars placed on goats.
- 1 collar (and goat) not recovered.
- 26 recovered with reservoirs intact (full).
- 4 collars recovered with 2 empty reservoirs.
- 7 collars recovered with 1 empty reservoir.
- 2 collars punctured by coyotes (3 reservoirs punctured).

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- Total of 18 reservoirs punctured = 270 uCi ¹³⁴Cs dispensed.
- Previous studies indicate about 28% of fluid from 60 mL collars ends up contaminating carcasses of goat.
- Hence, expect 81 uCi (.30 x 270) ¹³⁴Cs to be on carcasses of adult goats.

Kid goats:

- Each marking collars = 2 reservoirs each with 33.3 uCi ⁶⁵Zn.
- 30 collars placed on kid goats.
- 20 collars recovered with reservoirs full.
- 1 collar recovered with 2 reservoirs empty.
- 2 collars recovered with 1 reservoir empty.
- 2 collars punctured by coyotes (3 reservoirs punctured).

- Total of 7 reservoirs punctured = 233 uCi ⁶⁵Zn dispensed.
- Previous studies indicate about 39% of fluid from 30 mL collars ends up on the carcass of the goat.
- Hence expect about 93.2 uCi ⁶⁵Zn (.40 x 233) to be on carcasses of kid goats.

Potential radioactive materials in coyote carcasses:

⁵⁴Mn (assuming captured coyotes ingested all unrecovered baits):

- 187 baits, each with 12.25 uCi ⁵⁴Mn, placed in field and not recovered (total of 2290.75 uCi).
- Gut to blood absorption for Mn is 0.1 (229.075 uCi absorbed in coyote carcasses).
- Effective half life ⁵⁴Mn = 23 days.
- 1 February to 31 May = 120 days (5.2 effective half lives).
- 229 uCi x 5 eff. half lives = 7.16 uCi remaining in coyote carcasses.

¹²⁵I (assuming captured coyotes ingested all unrecovered baits):

- 188 baits, each with 2.0 uCi ¹²⁵I, placed in field and not recovered (total of 376 uCi).
- Gut to blood absorption for I is 1.0 (376 uCi absorbed in coyote carcasses).
- Effective half life ¹²⁵I = 42 days.
- 1 February to 31 May = 120 days (2.86 effective half lives).
- 376 uCi x 2.5 eff. half lives = 71 uCi remaining in coyote carcasses.

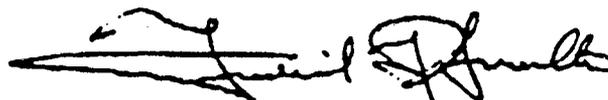
⁶⁵Zn (from collars punctured by coyotes):

- 3 reservoirs punctured by coyotes (total of 100 uCi ⁶⁵Zn dispensed during coyote attacks).
- Previous studies indicate on average coyotes ingest 3.2% of fluid from 30 mL collars.
- Hence coyotes estimated to ingest 3.2 uCi ⁶⁵Zn.

¹³⁴Cs (from collars punctured by coyotes):

- 3 reservoirs punctured by coyotes (total of 45 uCi ¹³⁴Cs dispensed during coyote attacks).
- Previous studies indicate on average coyotes ingest 11.1% of fluid from 60 mL collars.
- Hence coyotes estimated to ingest 5.0 uCi ¹³⁴Cs.

If additional information is needed in support of this request, please contact me by memorandum or telephone (801 + 750-2508).



Frederick F. Knowlton

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