Beagle thorax after inhalation of relatively insoluble radioactive particles containing ^{90}Sr-^{90}Y. Final analysis of the data will allow quantitation of anomalies in pulmonary deposition patterns, a better understanding of deposition and dose patterns, and a better correlation between absorbed radiation dose and biological response for Beagles exposed to relatively insoluble radioactive aerosols. Results also suggest that similar studies should be undertaken in other animal species to provide a better basis for interspecies comparisons.

4. Internal Dosimetry in Small Vertebrates Resident in a Fallout Field, *Robert K. Mullen (Mission Res Corp), Philip A. Medica (UCLA)*

On December 18, 1970, an underground nuclear explosion, Project Baneberry, accidently vented to the surface. The subsequent contamination of the desert floor in the vicinity of the accident provided an opportunity to study the effect of fallout radiation on several environmental components, among these a population of lizards resident in this area. There have been few opportunities for such research, the most proximate being the UCLA Rock Valley study in which a captive population of indigenous reptiles and mammals is continuously irradiated by a ^{137}Cs source elevated on a 50-m pole centrally located in an 8-ha (20-acre) enclosure.

Turner et al.[1] are reporting that a proportion of the female lizards in this population are sterile. Species in which this phenomenon has been observed are *Cnemidophorus tigris*, *Phrynosoma platyrhinos*, *Crotaphytus wislizeni*, and *Uta stansburiana*. Since the radiation field in which these animals reside is 10^3 to 10^4 times natural background, it was felt the same effect might be observed in lizards residing within the Baneberry fallout field.

Accordingly, several female *U. stansburiana* were collected and examined for gross appearance of the reproductive tract. It was determined that a proportionate number of these females were sterile; sterility being expressed either as a complete lack of ovarian tissue, or as the presence of one or two regressed and nonfunctional ovaries.

Since these animals are exposed to radiation from mixed fission products, both external and internally deposited, implantable dosimeter packages were designed to determine the amounts of beta and gamma radiation being deposited in the thoracoperitoneal cavities of these animals. Problems were experienced with the first two of these designs, leading to a third design which should be problem free. The dosimeter material, in all instances, has been CaF_2:Mn.

The initial design of these implantable dosimeter packages contained three CaF_2:Mn chips, 0.005 in. thick × $\frac{1}{16}$ in. square. Minimum sensitivity was 1 R gamma. One chip was shielded in lead, one in aluminum, and one left bare. Such sets were enclosed in Mylar adhesive film, and then implanted in the thoracoperitoneal cavities of captured male lizards. On recapture of these lizards some two to three months after implantation of dosimeters, it was discovered that the Mylar adhesive film had opened, exposing the enclosed dosimeters to body fluids. Further examination revealed these dosimeter chips to have been etched by the body fluids.

A second dosimeter package was then designed in which the dosimeter material for each individual dosimeter consisted of 10 μg of CaF_2:Mn powder encapsulated in a glass capillary 0.5 mm in diameter by 5 mm long. As previously, three dosimeters comprised a package. In this instance, however, differential shielding was accomplished with different masses of lead, rather than with lead and aluminum. Implantation of this dosimeter set required that one bare dosimeter and two differentially lead-shielded dosimeters be separately implanted in a lizard's thoracoperitoneal cavity. This procedure was tolerated, and the dosimeters were recovered 99 days following implantation.

The beta plus gamma exposure to these dosimeters was determined to be 12.5 R over the period in which the implanted lizards were exposed to Baneberry fallout radiation. Of this, 9.5 R was due to beta exposure, and 3.0 R to gamma. It was discovered that of those dosimeters placed in the field, there were several that had ^{40}K backgrounds sufficiently high to require background subtraction. This ^{40}K was, of course, in the glass capillary enclosing the dosimeter material.

Although the ^{40}K background may be subtracted from the external dose incident on the dosimeter material, this involves relatively long storage times for each dosimeter so it acquires a large enough ^{40}K dose to have confidence in. It also requires that each dosimeter be catalogued in a manner that permits unique identification during the period it is set aside for ^{40}K background assessment. This is inconvenient and can lead to bookkeeping errors which, in turn, will lead to erroneous dosimeter readings after retrieval from the field.

To avoid the problems associated with ^{40}K contamination, we plan to employ Teflon rod, 0.5 mm in diameter, loaded with 10-μg CaF_2:Mn/5-mm length of rod. Light transmission through this material is anticipated to be about 10% greater than with the previously employed glass envelope.

At the present time, the amount of radiation being deposited in the thoracoperitoneal cavities of the animals being studied exceeds, by a factor of 3 to 4, the amount that would be predicted on the basis of data accumulated with a survey meter. The present beta:gamma ratio in the Baneberry fallout field is about 3. Factors responsible for the apparent discrepancy between internal dosimetry and survey-meter-predicted data include the nature of the distribution and redistribution of the fallout in the study area, and the physiological ecology of the species being studied.

1. F. B. TURNER, P. LIGHT, J. D. THRASHER, P. A. MEDICA, and J. R. LANNOM, "Radiation-Induced Sterility in Natural Populations of Lizards *Crotaphytus wislizenii* and *Cnemidophorus tigris*," *Proc. 3rd Natl. Radioecology Symp.*, p. 1131 (1973).

5. A Radiobiologist's View of Light-Water Reactor Effluents, *Marvin Goldman, Steven A. Book (UC-Davis)*

The total radiological dose commitment to members of the public from normal reactor operations is the sum of exposures from a number of radionuclides, the type and quantity of which are dependent on meteorological and environmental characteristics and the design of the specific reactor. The patterns of radionuclide accumulation and retention by an individual are mediated by age-related metabolic parameters; therefore the dose rate to the fetus, child, and adult from equivalent exposures to effluent contaminants will differ due to developmental changes.

For individuals residing close to reactor sites now under construction, the predominant concern during

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