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Budget and Reports Division
January 13, 1954

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RESEARCH

Biology

Effects of Actinium on Experimental Animals--At Mound Laboratory, female rats carrying an extensive body burden of actinium equilibrium mixture gave birth to young that contained very little or no radioactive substances. As the young suckled, they picked up activity from the mothers' milk, and within about two weeks multiple fractures of the long bones occurred and X-ray examination showed a curious beaded structure. The experiments are being repeated, and the new protocol includes a specially fortified ration to check on the possibility that a nutritional deficiency might be involved. Continual measurements on animals from the original experiment will be required, however, to determine which isotopes are being transmitted in the milk.

Biophysics

Waste Disposal Research--A 30-gpm solids-contact water clarifier, designated "Erdlator" was tested on White Oak Creek water with approximately 10^{-2} μc/cc of P^{32}, I^{131}, or added fission products mixture co-agulated by using ferric chloride and pulverized limestone in standard operating procedures. Results from eleven runs indicated the unit could effect at least the following removals: P^{32}, 90 percent; I^{131}, 45 percent; two-months-old dissolver solution, 50 percent; a three-year-old fission-products mixture from the Chalk River reactor, 65 percent.

With the cooperation of the U. S. Geological Survey, Ground Water Branch, sites have been selected for the drilling of additional test wells in the area around Waste Pit No. 2 to supplement the data from the three existing wells. The water in two wells was found to be grossly contaminated with chemical salts, largely nitrates; and with Ru^{106}, possibly as the ruthenate, and its daughter product Rh^{106}. No contamination was found in the well 225 feet from the south end of the pit. During the past 18 months a total of 278,000 gallons of liquid wastes containing approximately 8,700 curies of activity have been transferred to this pit.

Consultation and Special Problems--The relative toxicity of U-233 was investigated to determine the extent to which the hazards associated with handling U-233 would influence the costs of manufacturing fuel elements. Chiefly because of its greater specific activity but also because of differences in energies, the hazard in the processing of U-233 would be 133 times that of U-235. Preliminary tests indicate that the additional precautions required for U-233 will lead to an approximately 20 percent increase in costs.