LETTERS TO THE EDITOR

ROTATING HOLDER FOR IRRADIATING SAMPLES

Dear Sir:

Because of flux gradients across irradiation facilities in a reactor, different parts of a large sample (or bundle of small samples) will receive different exposures, the average being unknown or difficult to determine with standards. For a position outside the reflector region of the Washington State University pool reactor, flux measurements made with copper wires revealed a 40% decrease across a 2-in. hydrogenous sample. A sample rotator, which holds six to eighteen 2-dram samples and rotates on a vertical axis, was constructed and tested for effectiveness in averaging the exposure.

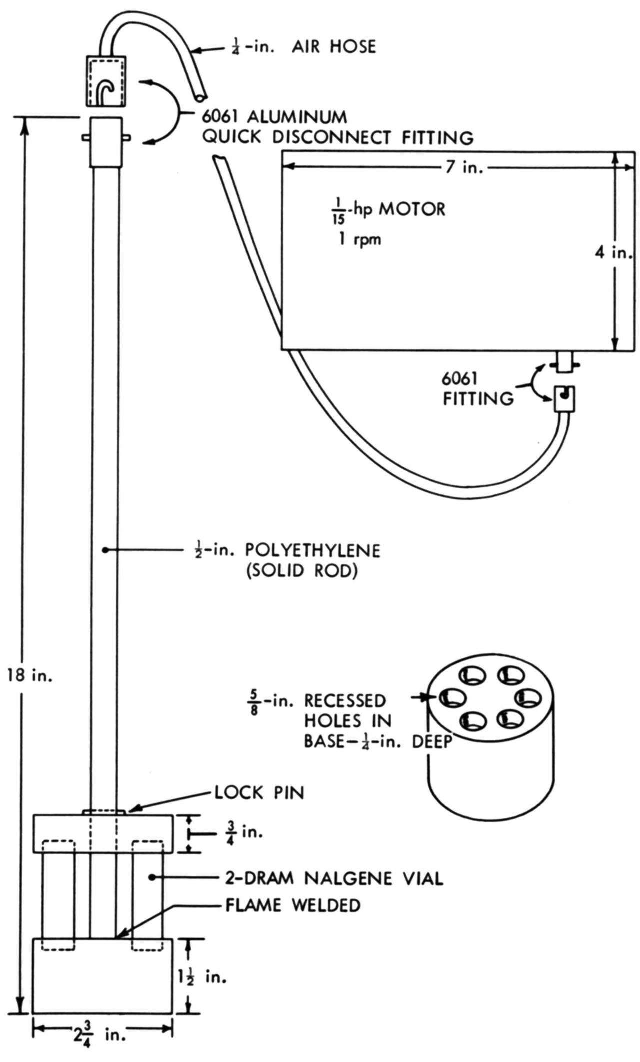

Fig. 1.

The sample rotator (Fig. 1) has been used successfully at the Washington State University pool reactor to irradiate simultaneously several small samples keeping variations in exposure to within less than counting statistics. The rotator has been reliable, is simple to construct and should be adaptable to all pool-type reactors.

The samples, first sealed in 2-dram polyethylene vials, are locked in a polyethylene sample holder. The sample holder is inserted into a 2.875-in.-i.d. aluminum irradiation tube that extends from the pool surface to the reactor core; the bottom of the irradiation tube has a square pedestal which plugs into the MTR-type grid box. The sample holder is rotated at 1 rpm by a $\frac{1}{15}$-hp motor located on the reactor bridge. The drive shaft, attached to the motor and sample holder by quick-disconnect fittings, is made $\frac{1}{4}$-in. air hose. The polyethylene sample holder is routinely replaced after 40 h use at 1 MW.

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FISSION PRODUCT DECAY HEAT

Dear Sir:

Decay heat from the fission of ^{235}U is a function of time at power and decay time. Figures 1 and 2 give the total decay heat (beta + gamma) from ^{235}U without further calculation. Figure 1, derived from Ref. 1 (Fig. 5), is a function of reactor operating time and decay time. Figure 2 is the burst curve from Ref. 1 (Figs. 3 and 4), and should be used when the decay time is >10 times the operating time. As an example, if a reactor had operated at 60 MW for ten days (8.64×10^5 sec) and we wish to determine the decay heat 10^5 sec (1.16 days) after shutdown, we obtain from Fig. 1 (2.4×10^{-3})

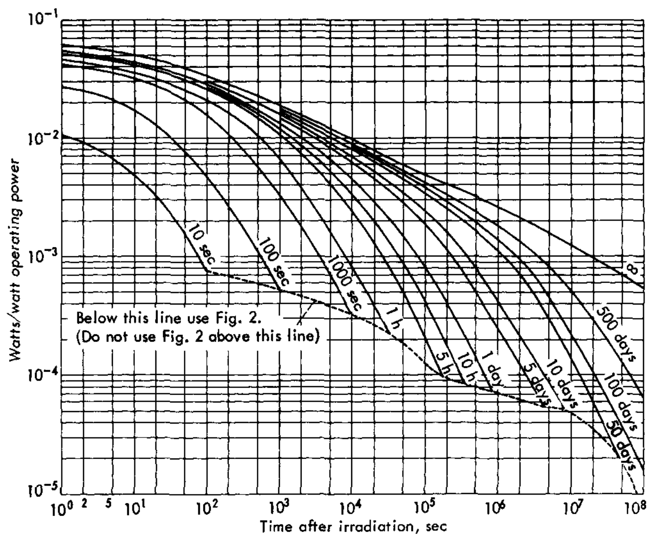

Fig. 1. ^{235}U fission product decay heat vs time after irradiation for a number of irradiation times.

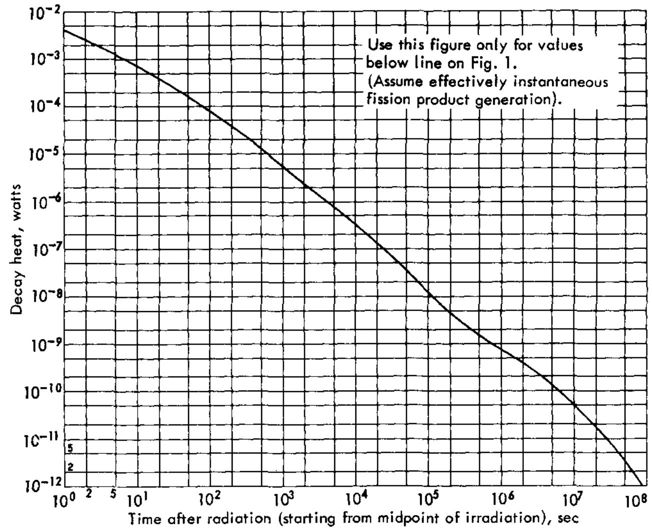

Fig. 2. ^{235}U fission product decay heat vs time after one watt-second irradiation.

(60 MW) = 0.144 MW decay heat. If we wish to determine the decay heat at 4.0×10^7 sec (1.27 year) from the midpoint of operation, which is > 10 times the operating time, we use Fig. 2 and find (5.0×10^{-12}) $(8.64 \times 10^5$ sec) (60 MW) = 259 watts.

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October 2, 1968

REFERENCE

1. J. R. STEHN and E. F. CLANCY, "Fission-Product Radioactivity and Heat Generation," *Proc. Intern. Conf. Peaceful Uses At. Energy, Geneva*, **13**, 49, United Nations (1958).

PROPER UNDERSTANDING NEEDED

Dear Sir:

The idea of including commentary on the social implications of science in a technical journal is most interesting and is particularly apt in a journal entitled *Nuclear Applications*. To fulfill its implicit promise, however, the sophistication and depth of such commentary should attempt to match the importance of the subject. The editorial in the November issue seems to fall somewhat short of this ideal.

For example, you suggest that "the possession of nuclear weapons . . . (has) . . . a deterrent effect on all nations . . . against a rash belligerent act that could escalate into an annihilating war." But isn't it just nuclear weapons that makes such an "annihilating war" possible? For your statement to be true, the probability of a conventional war occurring *and* being "annihilating" must be greater than the probability of a nuclear war occurring *and* being "annihilating." There is considerable historical reason to believe that such is not the case. Learning to live with nuclear weapons *is* considerably different from learning to live with fire or dynamite or automobiles. It is different for the same reason that blowing up 1/100th of the world 100 times throughout history is different from blowing up the whole world once.

I'm afraid I must also take exception to the notion that respect for science and scientists is going to be significantly enhanced by the peaceful applications of nuclear explosives. If scientists qua scientists should not be given the blame for the use of nuclear explosives to blow up people (and they shouldn't) why should they be given the credit for the use of nuclear explosives for digging canals? In fact neither of these activities are scientific activities. I would suggest that there is a greater need for the proper understanding of science and scientists by the public—and that includes the Congress as well as "the younger generation"—than for some ambiguous, if gratifying, "respect." In any case, I think we don't deserve the respect of the world if we think we can gain it by digging different and bigger holes for less money.

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