Radiation Hazard from Proposed P-9 Pile at X - F. L. Friedman

Calculations on the contamination produced in cooling water by a P-9 plant with Al coating on the metal have been made. They are appearing in a CP report. These computations are based on the most recent total disintegration energies and include β as well as γ rays to indicate danger in the water itself. The computation in CP-499 is used as a basis and some work of Wollan and Coryell have been generously made available for comparison purposes. Curves of fission product activity on the basis of Borst's data were employed in finding the effect of coating failure. For a 3.5×10^4KW plant at X, the Mg^{27} recoils from the Al may border on the assumed permissible limiting concentration in the water (corresponding to .1 r/day) of the river. A table of permissible coating failure vs. holdup time t is given below for long times of operation (ca 30 - 90 days).

Holdup time	10 m	1 hr.	1 d
Permissible fraction uncoated	.0019	.013	.069

The most recent design constants of a P-9 plant have been employed here (MUC-AMW-#5).

Some problems in X-ray shielding have been written up for presentation in the handbook and further consideration of reflector and shield problems for small piles is in progress. Some formulae for the slowing down of neutrons around a homogeneous spherical pile and the X-ray escape under the same conditions are already available.