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INTEROFFICE CORRESPONDENCE

Date: October 2, 1990

To: W. R. Carpenter, MS 2409

From: B. G. Schnitzler, MS 3515 B. G. Schnitzler

50-73

Subject: REVIEW OF GENERAL ELECTRIC RESEARCH REACTOR FUEL SELF-PROTECTION ASSESSMENT - BGS-9-90

References:
(a) G. E. Cunningham (GE) letter to T. S. Michaels (NRC) dated March 15, 1990
(b) G. E. Cunningham (GE) letter to T. S. Michaels (NRC) dated August 31, 1990
(c) B. G. Schnitzler, A Calculational Method for Determining Biological Dose Rates from Irradiated Research Reactor Fuel, NUREG-CR-4203, April 1985

The Code of Federal Regulations (10 CFR 73.6) establishes requirements for the physical protection of special nuclear material of moderate and low strategic significance. The level of physical protection at nonpower reactor facilities may be reduced if the special nuclear material has a total external radiation dose in excess of 100 rems per hour at a distance of three feet.

Reference (a) transmitted a self-protection assessment for fuel of the General Electric Nuclear Test Reactor (NTR) at the Vallecitos Nuclear Center in Pleasanton, California. The referenced transmittal indicated a self-protection time in excess of 80 days based on an axial dose point and on the order of 160 days based on a dose point located at the axial mid-plane. The reactor power history modelling employed was conservative from a radiological protection standpoint, but nonconservative for the purposes of demonstrating fuel self-protection.

Reference (b) transmitted a revised self-protection assessment for the NTR fuel. The modelling employed in the revised transmittal is conservative for the purposes of demonstrating fuel self-protection. The gamma dose rate at the axial mid-plane remains above 100 rems per hour for about 29 days.

Comparable results were obtained in an independent calculation using the GE-NTR power history from Reference (b) and the INEL fuel self-protection code described in Reference (c). Although the FUELDR code does not contain a GE-NTR geometric model, comparable photon transport can be expected from similar plate type fuel elements.

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