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MERITS OF ADDITIONAL STUDIES BY THE NATIONAL ACADEMY OF SCIENCES ON
RADIATION INJURY

Recently, several studies have cast doubt on the validity of the health risk estimates derived by the NAS Advisory Committee on the Biological Effects of Ionizing Radiation (BEIR) in their 1972 report. These studies range from showing that the BEIR estimates were too conservative in disregarding departures from a linear dose-effect relationship at low dose (i.e. WASH-1400 Task Group) to those indicating that the original BEIR estimates underestimate the risk (Mancuso, Stewart, and Kneale).

The original BEIR report was largely devoted to a review of human exposure data. Although the NCRP Scientific Committee SC-40, on the Biological Aspects of Radiation Protection Criteria is currently reviewing the question of dose-effect relationships at low doses, I believe that there still would be merit in having the NAS perform a three-phase review of this issue because of its importance to the setting of radiation standards for the protection of public health and safety. The three phases that I envision for this review, which could be funded jointly by NRC (RES), EPA, ERDA, and BRH, would be:

1. reexamine the BEIR 1972 estimates in light of human data developed subsequent to information reviewed in the 1972 report,
2. review the existing data on mammalian radiobiological studies (including animal data) and relate these experimental findings to models of dose-effects relationships developed by Rossi, Baum, and others and summarize the knowledge about:
 - (a) The mechanisms of radiation injury;
 - (b) potentiation, co-carcinogenesis or other synergistic effects with other environmental factors such as pre-existing disease, or other toxic substances in the environment,
 - (c) the apparent dose-rate dependence for health effects due to high-LET and low-LET radiation, specifically the RBE for neutrons and Alpha particles;
 - (d) the agreement or contradiction of experimental evidence and the predictions of various dose-effect models.

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3. Recommendations on the assumptions or models of dose-effect relationships that should be used in setting standards for:
- (a) occupationally-exposed individuals,
 - (b) individuals in the general population including the fetus, women of child-bearing age, children, and adults; and
 - (c) large segments of the general population; and recommendations for where future radiobiological or epidemiological studies would be likely to produce data of value.

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