Preface

The National Council on Radiation Protection and Measurements (NCRP) has a long history of issuing guidance on operational radiation safety including radiation exposure limits for radiation workers and members of the public. Effective dose limits are based on the linear-nonthreshold (LNT) dose effects model, which is based almost entirely on the human epidemiology data. This Commentary provides a review of recent epidemiologic studies of low linear-energy transfer radiation, primarily at low doses or low dose rates, and an evaluation of whether the new observations provide support for the LNT model as used in radiation protection today. This Commentary represents an update of the guidance provided in NCRP Report No. 136, Evaluation of the Linear-Nonthreshold Dose-Response Model for Ionizing Radiation (2001). The Commentary was prepared for use by Council Committee 1 and their report on Management of Exposure to Ionizing Radiation: Radiation Protection Guidance for the United States.

This Commentary was prepared by Scientific Committee 1-25 on Recent Epidemiologic Studies and Implications for the Linear-Nonthreshold Model. Serving on Scientific Committee 1-25 were:

**Roy E. Shore, Chairman**  
Radiation Effects Research Foundation (retired)  
Easton, Pennsylvania

**Lawrence T. Dauer, Co-Chair**  
Memorial Sloan Kettering Cancer Center  
New York, New York

**Members**

**Harold L. Beck**  
U.S. Department of Energy (retired)  
New York, New York

**Fred A. Mettler, Jr.**  
University of New Mexico  
Albuquerque, New Mexico

**Emily A. Caffrey**  
Radian Scientific  
Huntsville, Alabama

**R. Julian Preston**  
U.S. Environmental Protection Agency (retired)  
Cary, North Carolina

**Scott Davis**  
Fred Hutchinson Cancer Research Center  
Seattle, Washington

**John E. Till**  
Risk Assessment Corporation  
Neeses, South Carolina

**Helen A. Grogan**  
Cascade Scientific  
Bend, Oregon

**Richard Wakeford**  
University of Manchester  
Manchester, England

**Randall N. Hyer**  
Center for Risk Communication  
Philadelphia, Pennsylvania

**Linda Walsh**  
University of Zurich  
Switzerland
The Council wishes to express its appreciation to the Committee members for the time and effort devoted to the preparation of this Commentary and to the U.S. Nuclear Regulatory Commission (Grant NRC-HQ-60-14-G-0012) for financial support.

NCRP could not continue to address the radiation protection needs of the nation without the willingness of Council members to serve, review and advise and without the partnership of agencies to work together for the good of the people and the well-being of the nation.

John D. Boice, Jr.
President