

Annual Report

N | C | R | P

2002

Year in Review

Table of Contents

Charter	2
President's Message	3
Membership	7
Administrative Committees	13
Scientific and Administrative Staff	14
Scientific Program Area Committees	15
Basic Criteria, Epidemiology, Radiobiology, and Risk	17
Operational Radiation Safety	20
Environmental Issues	23
Radioactive and Mixed Waste	25
Nonionizing Radiation	27
Radiation Protection in Medicine	30
Public Policy and Risk Communication	32
Radiation Measurement and Dosimetry	33
Other Scientific Committees	34
Lauriston S. Taylor Lectures	36
Collaborating Organizations	38
Special Liaison Organizations	41
Corporate Sponsors	42
Review Process	43
Annual Meetings	44
Appendix 1. Finances	49
Appendix 2. Publications	61

Charter

The National Council on Radiation Protection and Measurements is a nonprofit corporation chartered by Congress in 1964 to:

1. Collect, analyze, develop and disseminate in the public interest information and recommendations about (a) protection against radiation and (b) radiation measurements, quantities and units, particularly those concerned with radiation protection.
2. Provide a means by which organizations concerned with the scientific and related aspects of radiation protection and of radiation quantities, units and measurements may cooperate for effective utilization of their combined resources, and to stimulate the work of such organizations.
3. Develop basic concepts about radiation quantities, units and measurements, about the application of these concepts, and about radiation protection.
4. Cooperate with the International Commission on Radiological Protection, the International Commission on Radiation Units and Measurements, and other national and international organizations, governmental and private, concerned with radiation quantities, units and measurements and with radiation protection.

The Council is the successor to the unincorporated association of scientists known as the National Committee on Radiation Protection and Measurements and was formed to carry on the work begun by the Committee in 1929.

The participants in the Council's work are the Council members and members of scientific and administrative committees. Council members are selected solely on the basis of their scientific expertise and serve as individuals, not as representatives of any particular organization. The scientific committees, composed of experts having detailed knowledge and competence in the particular area of the committee's interest, draft proposed recommendations. These are then submitted to the full membership of the Council for careful review and approval before being published.

President's Message

The year 2002 was marked by continued productivity and a renewed optimism for a financially secure future. Several major reports were published; a number of long-term report activities made significant progress toward publication; and new sponsors and activities of importance for homeland security, the cleanup and disposition of nuclear waste materials, and radiological health protection for members of the public were undertaken. NCRP reports published in 2002 were the following.

NCRP Report No. 139, *Risk-Based Classification of Radioactive and Hazardous Chemical Wastes*, prepared under the chairmanship of Dr. Allen G. Croff, is an important contribution towards the development of a generally applicable classification system for any waste materials that contain radionuclides, hazardous chemicals, or mixtures of the two. A risk index is proposed that can be evaluated for all types of waste and used as a basis for classifying the level of risk posed by disposal of a given waste material, as well as the type of disposal system that would be appropriate for that material. The adoption of the proposed risk-based classification system could resolve many of the inconsistencies that currently exist in waste classification and disposal policies.

NCRP Report No. 140, *Exposure Criteria for Medical Diagnostic Ultrasound: II. Criteria Based on All Known Mechanisms*, prepared under the chairmanship of Dr. Wesley L. Nyborg, is the third comprehensive NCRP report that provides the scientific basis for safety analysis in diagnostic medical ultrasound. An important feature of Report No. 140 is the extensive evaluation of nonthermal mechanisms of tissue interactions with ultrasound, including acoustic cavitation and other mechanical processes. This NCRP Report provides a wealth of new information and analyses of potential mechanisms of ultrasound-induced changes in cells and tissues, and is essential reading for medical practitioners of ultrasound diagnostic and therapeutic technologies.

NCRP Report No. 141, *Managing Potentially Radioactive Scrap Metal*, prepared under the chairmanship of Dr. Shih-Yew Chen, discusses the available options for either recycling or disposing of the large amount of potentially radioactive scrap metals generated as a result of the decommissioning and dismantling of nuclear power plants, nuclear weapons production facilities, and other nuclear facilities such as research reactors, test reactors, and accelerators. The focus is not only on providing an in-depth discussion of possible options for clearing and recycling these metals, but also on the need to design new nuclear facilities in a manner that reduces the extent of metal contamination. Report No. 141 also emphasizes the need to evaluate health and environmental impacts as a basis for developing standards on the clearance of these materials for recycling or release into the public domain.

NCRP Report No. 142, *Operational Radiation Safety Program for Astronauts in Low-Earth Orbit: A Basic Framework*, chaired by Dr. Richard J. Vetter, provides a comprehensive description of all elements of an operational radiation safety program for astronauts in low-Earth orbit missions. Report No. 142 describes the methods to be used for implementing the radiation exposure guidelines for

astronauts that were presented in NCRP Report No. 132, *Radiation Protection Guidance for Activities in Low-Earth Orbit*, which was published in December 2000.

In addition to the full NCRP reports published in 2002, NCRP issued two presidential reports. These reports are intended to address, in a rapid manner, issues of importance to the government and public organizations concerned with the safety of new technologies involving the use of either ionizing or nonionizing radiation. The presidential reports are subjected to extensive peer review by members of Council and other subject-area experts. The total time from the initiation to completion of the two presidential reports issued in 2002, including peer review, was three months each.

The first of these presidential reports was issued on September 20, 2002, on the topic of *Radiation Protection Advice for Pulsed Fast Neutron Analysis (PFNA) System Used in Security Surveillance*. The Report was prepared by a committee chaired by Dr. Leslie A. Braby. PFNA is being considered as a new security surveillance device for detecting contraband in cargo containers crossing United States borders. This Report provided an analysis of the appropriate dose limit for individuals who might be inadvertently irradiated by the PFNA system (e.g., stowaways), and the appropriate methods for determining the dose received by such individuals. In addition, the Report addressed the level of activation products in pharmaceuticals and implanted medical devices that could result from irradiation by the PFNA system.

The second presidential report was issued on December 20, 2002, on the topic of *Wireless Telecommunications Radiofrequency Safety Issues for Building Owners and Managers*. The Report was prepared by a committee chaired by the NCRP President, and provides an evaluation of, and guidance on, key safety issues associated with radiofrequency field exposures of workers and members of the public that result from the siting of wireless telecommunications base stations on the rooftops of buildings.

Another 2002 publication was the proceedings of the 37th NCRP Annual Meeting held on April 4-5, 2001, on the topic *Fallout from Atmospheric Nuclear Tests—Impact on Science and Society*. The proceedings, along with the 25th Lauriston S. Taylor Lecture by Dr. Wesley L. Nyborg on *Assuring the Safety of Medical Diagnostic Ultrasound*, was published in the May 2002 issue of *Health Physics* (Vol. 82, No. 5). NCRP is indebted to the Program Committee, chaired by Mr. Harold L. Beck, for organizing an excellent annual meeting on a topic that has been of scientific and societal importance for more than five decades.

NCRP also organized a symposium on the important subject of *Patient Doses in Computerized Tomography (CT)*, that was held in Arlington, Virginia, on November 6-7, 2002. This Symposium focused on the relatively high doses received by patients, especially children, that undergo this increasingly popular form of medical imaging. Speakers and attendees at the symposium included radiologists, regulators, representatives of CT equipment manufacturing companies, educators, and members of the public. The outcome of the Symposium was a consensus agreement on a set of recommended actions to reduce the radiation doses resulting from CT procedures, especially those using the newer helical and multislice CT technologies. A summary of the symposium and the recommendations on patient dose reduction will be published in the *American Journal of Roentgenology* in early 2003. NCRP is very grateful to the National Cancer Institute for funding the symposium; to Dr. Fred A.

Mettler, who chaired the Program Committee; and to Mr. Otha Linton, who played a key role in organizing the Symposium and in preparing the Symposium summary for publication.

The year 2003 promises to be equally eventful, with several NCRP reports and other publications nearing completion. Of special note are the following activities. The following four NCRP reports will be published: (1) *Management Techniques for Laboratories and Other Small Institutional Generators to Minimize Off-Site Disposal of Low-Level Radioactive Waste*, prepared by Scientific Committee 87-1 under the chairmanship of Mr. William P. Dornsife; (2) *Radiation Protection in Dentistry*, prepared by Scientific Committee 91-2 under the co-chairmanship of Dr. John W. Brand and Dr. S. Julian Gibbs; (3) *Radiation Protection in Veterinary Medicine*, prepared by Scientific Committee 46-16 under the chairmanship of Dr. Kenneth R. Kase; and (4) *Structural Shielding Design for Diagnostic and Interventional Medical X-Ray Facilities*, prepared by Scientific Committee 9 under the co-chairmanship of Dr. Benjamin R. Archer and Dr. Joel E. Gray. In addition, *Biological Effects and Exposure Recommendations for Modulated Radiofrequency Fields*, an NCRP commentary prepared by Scientific Committee 89-4 under the chairmanship of Dr. Om P. Gandhi, will be published in 2003. Several other NCRP reports are in an advanced stage of preparation and are expected to be published either in late 2003 or the early part of 2004.

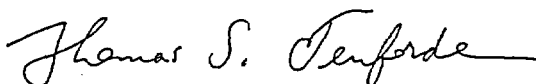
Three presidential reports related to the use of ionizing radiation for security surveillance screening will be published in 2003. Two of these presidential reports are the work of Scientific Committee 1-11, chaired by Dr. Leslie A. Braby, and are entitled *Radiation Protection Advice for the Pulsed Fast Neutron Analysis System Used in Security Surveillance: Part II. The ALARA Principle and Related Issues and Recommended Methods and Instrumentation for Measuring and Determining Individual Radiation Dose from the Pulsed Fast Neutron Analysis System*. The third presidential report to be published in 2003 is *Radiation Protection Advice: Screening of Humans for Security Purposes Using Ionizing Radiation Scanning Systems*, prepared by Scientific Committee 1-12 under the chairmanship of Mr. Kenneth L. Miller. A journal article prepared by Scientific Committee 1-10 under the chairmanship of Dr. Clark W. Heath on the subject *Residential Radon Exposure and Lung Cancer Risk: Commentary on Cohen's County-Based Study* is expected to be published in 2003. Finally, the proceedings of the 38th Annual Meeting, held on April 10-11, 2002 on the topic *Where the New Biology Meets Epidemiology: Impact on Radiation Risk Estimates*, will be published in *Health Physics* during 2003. NCRP is very grateful to the program committee for the 2002 annual meeting, chaired by Dr. Eric J. Hall, for organizing this outstanding meeting. The 39th Annual Meeting, which has been planned by a Program Committee chaired by Dr. John E. Till, will be held on April 9-10, 2003 on the topic *Radiation Protection at the Beginning of the 21st Century—A Look Forward*.

From the perspective of NCRP's operations and financial stability, it should be noted that the income from grants, contracts and contributions increased relative to 2001. On a cost basis the income from sponsors and contributors essentially offset the operating costs associated with conferences and the preparation and publication of reports. Other financial gains were achieved through the reduction of NCRP's office space by 1,100 square feet and the increased use of teleconferencing and e-mail correspondence by the scientific committees.

There were, however, two large losses that are dominant factors in the 2002 budget presented in this Annual Report on an accrual basis. First, there was a loss of approximately \$255K for the write-off of about half of the large inventory of publications that had traditionally been maintained in storage by NCRP. The decrease in this inventory, which included numerous copies of many older NCRP reports, commentaries and annual meeting proceedings with little sales potential, will ultimately save NCRP a substantial amount of money through the reduction of storage costs. Second, NCRP investments decreased in value by approximately \$155K, or about 17 percent of their value at the end of 2001. This loss is consistent with the overall downward trend in the value of investment funds in the United States during 2002. This decrease in value, however, is classified as unrealized because the funds are expected to be recovered once the United States market begins to rebound from its poor performance in 2002.

I would like to conclude my first President's message by expressing the enjoyment I have experienced during the past year in helping to build new programs and acquire new sponsors for NCRP's work in radiation health protection. Many challenges face NCRP in 2003 and beyond, including participation in the analysis of radiation risks related to the management and disposition of nuclear waste materials, new diagnostic and therapeutic medical procedures, radiological terrorism events, and a rapidly growing assortment of technologies that make productive use of ionizing and nonionizing radiation.

NCRP also faces the challenge of defining more clearly its central role in establishing safe radiation policies and practices in the United States. Achieving recognition for this role requires a concerted effort to win the confidence of federal and state governments, the private sector, and collaborating scientific organizations in the United States and worldwide. The key element of this recognition will be the ability of NCRP to produce timely documents that provide guidance to assure the highest possible level of radiation health protection in the workplace, in medical procedures, and in public venues. NCRP has been taking important steps toward achieving this recognition and the confidence of governmental and public organizations. I look forward to working with members of the Council and NCRP's many collaborators in continuing this effort during the year that lies ahead.



Thomas S. Tenforde
President

Membership

There are presently 95 Council Members serving six year terms. There are normally 12 to 15 vacancies each year. Election of Council Members is based on nominations made by committee chairmen, current Council members, and the Nominating Committee. New members are nominated and elected based primarily on the scientific contributions they have made to the work of the Council and/or recognized interest and scientific or professional competence in some aspect of radiation protection and measurements. In addition, the Board of Directors recommends that candidates with specific areas of expertise be sought based on the needs of the Council. The Council is comprised of specialists in biophysics, dentistry, dosimetry, environmental transport, epidemiology, genetics, health physics, medical physics, nuclear medicine, pathology, physics, public health, public policy, radiation measurements, radiation therapy, radiobiology, radiology, risk communication, statistics, and waste management. In 2002 there were 12 vacancies and five new positions approved by the Board. Thirteen new members were elected and three members were re-elected. The 13 new members were:

Jerrold T. Bushberg	William F. Morgan
John F. Cardella	Bruce A. Napier
Mary E. Clark	Carl J. Paperiello
John R. Frazier	Roy E. Shore
Thomas F. Gesell	Daniel J. Strom
John W. Hirshfeld, Jr.	Thomas S. Tenforde
Barbara J. McNeil	

2002 Council Membership

John F. Ahearne	Sigma Xi	1999–2005
✓ Larry E. Anderson	Pacific Northwest National Laboratory	2000–2006
Benjamin R. Archer	Baylor College of Medicine	2000–2006
Mary M. Austin-Seymour	University of Washington School of Medicine	2001–2007
✓ Harold L. Beck	Retired	1998–2004
✓ Eleanor A. Blakely	Lawrence Berkeley Laboratory	2000–2006
✓ John D. Boice, Jr.	International Epidemiology Institute	1997–2003
Thomas B. Borak	Colorado State University	2001–2007
André Bouville	National Cancer Institute	1999–2005

Annual Report

N C R P

Leslie A. Braby	Texas A&M University	1995-2001
David J. Brenner	Columbia University	1998-2004
✓Antone L. Brooks	Washington State University, Tricities	1997-2003
Jerrold T. Bushberg	University of California, Davis	2002-2008
John F. Cardella	State University of New York, Upstate Medical University	2002-2008
✓S.Y. Chen	Argonne National Laboratory	1999-2005
Chung-Kwang Chou	Motorola Florida Research Laboratories	1998-2004
✓Mary E. Clark	U.S. Environmental Protection Agency	2002-2008
James E. Cleaver	University of California, San Francisco	2000-2006
✓J. Donald Cossairt	Fermi National Accelerator Laboratory	1995-2001
Allen G. Croff	Oak Ridge National Laboratory	1998-2004
Francis A. Cucinotta	NASA Lyndon B. Johnson Space Center	2001-2007
E. Gail de Planque	Consultant	1997-2003
Paul M. DeLuca	University of Wisconsin	2002-2008
Carter Denniston	University of Wisconsin	1999-2005
John F. Dicello	Johns Hopkins Oncology Center	2000-2006
Sarah S. Donaldson	Stanford University Medical School	1998-2004
William P. Dornsife	Waste Control Specialists	2000-2006
Stephen A. Feig	Mt. Sinai	2000-2006
H. Keith Florig	Carnegie Mellon University	1998-2004
Kenneth R. Foster	University of Pennsylvania	2000-2006
✓John R. Frazier	Auxier & Associates, Inc.	2002-2008
✓Thomas F. Gesell	Idaho State University	2002-2008
Ethel S. Gilbert	National Cancer Institute	1999-2005
✓Joel E. Gray	Landauer, Inc.	1999-2005
Andrew J. Grosovsky	University of California, Riverside	2001-2007
✓Raymond A. Guilmette	Los Alamos National Laboratory	1997-2003
William R. Hendee	Medical College of Wisconsin	1997-2003
John W. Hirshfeld	University of Pennsylvania School of Medicine	2002-2008
David G. Hoel	Medical University of South Carolina	1998-2004
✓F. Owen Hoffman	SENES Oak Ridge, Inc.	1998-2004
Geoffrey R. Howe	Columbia University	1997-2003
✓Kenneth R. Kase	Stanford Linear Accelerator Center	1999-2005
Ann R. Kennedy	University of Pennsylvania School of Medicine	2001-2007
David C. Kocher	SENES Oak Ridge, Inc.	1999-2005
Ritsuko Komaki	M.D. Anderson Cancer Center	2000-2006
✓Amy Kronenberg	Lawrence Berkeley National Laboratory	1999-2005
Charles E. Land	National Cancer Institute	1999-2005
✓Susan M. Langhorst	Washington University, St. Louis	1999-2005

Richard W. Leggett	Oak Ridge National Laboratory	1998–2004
Howard L. Liber	Colorado State University	1998–2004
✓ James C. Lin	University of Illinois, Chicago	1999–2005
✓ Jill A. Lipoti	New Jersey Department of Environmental Protection	2001–2007
John B. Little	Harvard University School of Public Health	1997–2003
Jay H. Lubin	National Cancer Institute	2000–2006
C. Douglas Maynard	Wake Forest University School of Medicine	2000–2006
Claire M. Mays	Institut Symlog, France	2000–2006
Barbara J. McNeil	Harvard Medical School	2002–2008
✓ Fred A. Mettler, Jr.	University of New Mexico	1998–2004
Charles W. Miller	Centers for Disease Control and Prevention	2000–2006
Jack Miller	Lawrence Berkeley National Laboratory	2001–2007
Kenneth L. Miller	The Milton S. Hershey Medical School	1995–2001
William F. Morgan	University of Maryland School of Medicine	2002–2008
John E. Moulder	Medical College of Wisconsin	2000–2006
David S. Myers	Lawrence Livermore National Laboratory	1995–2001
✓ Bruce A. Napier	Pacific Northwest National Laboratory	2002–2008
✓ Carl J. Paperiello	U.S. Nuclear Regulatory Commission	2002–2008
✓ Ronald C. Petersen	Retired	1999–2005
✓ R. Julian Preston	U.S. Environmental Protection Agency	1997–2003
Jerome S. Puskin	U.S. Environmental Protection Agency	1999–2005
✓ Marvin Rosenstein	Consultant	2000–2006
✓ Lawrence N. Rothenberg	Memorial Sloan-Kettering Cancer Center	1998–2004
✓ Henry D. Royal	Mallinckrodt Institute of Radiology	2002–2008
Michael T. Ryan	Charleston Southern University	1998–2004
Jonathan M. Samet	Johns Hopkins University	2002–2008
Stephen M. Seltzer	National Institute of Standards and Technology	1998–2004
Roy E. Shore	New York University Medical Center	2002–2008
✓ Edward A. Sickles	University of California Medical Center	2001–2007
✓ David H. Sliney	U.S. Army Center for Health Promotion and Preventive Medicine	1998–2004
Paul Slovic	Decision Research	1999–2005
✓ Daniel J. Strom	Pacific Northwest National Laboratory	2002–2008
Louise C. Strong	M.D. Anderson Cancer Center	1997–2003
✓ Thomas S. Tenforde	National Council on Radiation Protection and Measurements	2002–2008
Lawrence W. Townsend	University of Tennessee	1998–2004
Lois B. Travis	National Cancer Institute	2001–2007
Robert L. Ullrich	Colorado State University	2000–2006
✓ Richard J. Vetter	Mayo Clinic	1998–2004

Daniel E. Wartenberg	Environmental and Occupational Science and Health Institute	2000–2006
David A. Weber	Department of Veterans Affairs	1999–2005
F. Ward Whicker	Colorado State University	1998–2004
Chris G. Whipple	Environ	1995–2001
✓ J. Frank Wilson	Medical College of Wisconsin	1997–2003
Susan D. Wiltshire	J.K. Research Associates	1997–2003
Marco A. Zaider	Memorial Sloan-Kettering Cancer Center	1999–2005
Pasquale Zanzonico	Memorial Sloan Kettering Cancer Center	2001–2007
✓ Marvin C. Ziskin	Temple University School of Medicine	1999–2005

Board of Directors

Kenneth R. Kase	R. Julian Preston	Richard J. Vetter
Amy Kronenberg	Henry D. Royal	Susan D. Wiltshire
Jill A. Lipoti	Thomas S. Tenforde	Marvin C. Ziskin
Ronald C. Petersen		

Newly elected to the Board of Directors in 2002 were Kenneth R. Kase, Amy Kronenberg, Jill A. Lipoti, and Thomas S. Tenforde. Retiring members were S. James Adelstein, C. Douglas Maynard, Charles B. Meinhold, and Robert L. Ullrich. Michael T. Ryan resigned in May 2002.

Officers

President	Thomas S. Tenforde
Senior Vice President	Kenneth R. Kase
Secretary and Treasurer	William M. Beckner
Assistant Secretary	Michael F. McBride

Honorary Members

Lauriston S. Taylor, Honorary President

Warren K. Sinclair, President Emeritus; Charles B. Meinhold,* President Emeritus

S. James Adelstein,* Honorary Vice President; Hymer L. Friedell,† Honorary Vice President

W. Roger Ney, Executive Director Emeritus

Seymour Abrahamson

Edward L. Alpen

Lynn R. Anspaugh*

John A. Auxier

William J. Bair

Bruce B. Boecker

Victor P. Bond

Robert L. Brent

Reynold F. Brown

Melvin W. Carter

Randall S. Caswell

Frederick P. Cowan

James F. Crow

Gerald D. Dodd

Patricia W. Durbin

Keith F. Eckerman*

Thomas S. Ely

Richard F. Foster

R.J. Michael Fry

Robert O. Gorson

Arthur W. Guy

Eric J. Hall

Naomi H. Harley

John W. Healy†

Donald G. Jacobs

Bernd Kahn

Roger O. McClellan*

Dade W. Moeller

A. Alan Moghissi

Robert J. Nelsen

Wesley L. Nyborg

John W. Poston, Sr.*

Andrew K. Poznanski

Chester R. Richmond

William L. Russell

Eugene L. Saenger

William J. Schull

J. Newell Stannard

John B. Storer

John E. Till*

Arthur C. Upton

George L. Voelz

Edward W. Webster

*Elected to Honorary Membership April 11, 2002.

†Deceased during 2002.

Consociate Members

Full members of the Council become Consociate Members at the end of their terms provided they are not re-elected to another term on the Council or are not appointed to Honorary membership.

Roy E. Albert†	Robert A. Goepf	Eugene F. Oakberg
Peter R. Almond	Barry B. Goldberg	Gilbert S. Omenn
Charles M. Barnes	Marvin Goldman	Frank L. Parker
John W. Baum	Douglas Grahm	Lester J. Peters
Michael A. Bender	Ellis M. Hall	Norman C. Rasmussen
Merrill A. Bender	Robert J. Hasterlik	William C. Reinig
B. Gordon Blaylock*	John M. Heslep	Robert Robbins
Frederick J. Bonte	George B. Hutchison	James S. Robertson
Harold S. Boyne	Marylou Ingram	Genevieve S. Roessler*
John W. Brand	Seymour Jablon	Lester Rogers
A. Bertrand Brill	A. Everette James, Jr.	Robert E. Rowland
Francis R. Bruce	John R. Johnson	Keith J. Schiager
Thomas F. Budinger	James G. Kereiakes	Robert A. Schlenker
Patricia A. Buffler*	H. William Koch	Raymond Seltzer
William W. Burr, Jr.	Harold L. Kundel	Ferdinand J. Shore
Paul L. Carson	John S. Laughlin	Kenneth W. Skrable
Donald K. Chadwick	George R. Leopold	Lewis V. Spencer
Stephen F. Cleary	Edward B. Lewis	Chauncey Starr
Fred T. Cross	Thomas A. Lincoln	James H. Sterner
Stanley B. Curtis	David I. Livermore	Herman D. Suit
Richard L. Doan	Ray D. Lloyd	Richard A. Tell
Carl H. Durney	Richard A. Luben	William L. Templeton
Marc Edwards*	Arthur C. Lucas	Joop W. Thiessen
Charles M. Eisenhauer	Harry R. Maxon	Ralph H. Thomas
Joe A. Elder	Thomas F. Meaney	James E. Turner
Edward R. Epp	Mortimer L. Mendelsohn	John C. Villforth
Donald C. Fleckenstein	Robert W. Miller	Niel Wald
Everett G. Fuller	William A. Mills	H. Rodney Withers
Arthur H. Gladstein	Paul E. Morrow	McDonald E. Wrenn†
	Peter C. Nowell	

*Elected to Consociate Membership April 11, 2002.

†Deceased during 2002.

Administrative Committees

Budget & Finance Committee [appointed by the BOD, April 11, 2002]

Henry D. Royal, *Chairman*

Benjamin R. Archer

Jill A. Lipoti

C. Douglas Maynard

Stephen M. Seltzer

Nominating Committee [appointed by the BOD, April 11, 2002]

Richard J. Vetter, *Chairman*

Paul M. DeLuca

Stephen A. Feig

Amy Kronenberg

Paul Slovic

Program Committee for 2003 Annual Meeting

[appointed by the BOD, April 11, 2002]

John E. Till, *Chairman*

John D. Boice, Jr.

Mary E. Clark

Roger H. Clarke

John R. Frazier

Jill A. Lipoti

R. Julian Preston

Scientific and Administrative Staff

Stephanie J. Alleman	Scientific Committee Support Supervisor
Laura J. Atwell	NCRP Executive Secretary Meeting Coordinator ICRU Assistant Executive Secretary
Patricia H. Barnhill	NCRP Receptionist Word Processor ISR Support Staff
Luvenia J. Hawkins	Word Processor
Michael Jaszenko	LAN Supervisor and Technical Assistant
Constantine J. Maletskos	Staff Consultant
Cindy L. O'Brien	Managing Editor
Marvin Rosenstein	Staff Consultant
Carlotta M. Teague	Publications Manager
Bonnie G. Walker	Word Processor
E. Ivan White	Staff Consultant
Myrna A. Young	Financial Records Manager

Scientific Program Area Committees

The scientific program area committees advise the NCRP's Board of Directors on issues specific to their expertise. They have responsibility for evaluating the need for new NCRP activities related to the philosophy and the basic principles and requirements in their subject areas.

The work of the Council is supported by eight scientific program area committees. The program areas are:

Basic Criteria, Epidemiology, Radiobiology, and Risk, R. Julian Preston
 Environmental Issues, F. Ward Whicker
 Nonionizing Radiation, Ronald C. Petersen
 Operational Radiation Safety, Susan M. Langhorst
 Public Policy and Risk Communication, Susan D. Wiltshire
 Radiation Measurement and Dosimetry, Thomas F. Gesell
 Radiation Protection in Medicine, Henry D. Royal
 Radioactive and Mixed Waste, F. Ward Whicker

In addition, there is a group of committees operating under the general guidance of a Scientific Advisor, Bruce B. Boecker, on Internal Emitters.

During 2002, NCRP developed a plan for reorganization of its program area committees that will be fully implemented in 2003. The new structure, which consists of five program area committees and two advisory committees, is described on page 16.

Vice Presidents

Each scientific program area committee is chaired by an NCRP Vice President. The Vice Presidents:

- Chair their scientific program area committee
- Provide recommendations for new work in their program area
- Represent the NCRP to the federal agencies and other potential program supporters
- Represent the NCRP at scientific meetings
- Advise on the membership of their scientific program area committee
- Assist chairmen of new scientific committees with the selection of potential committee members
- Assist in the management of the scientific committee efforts under the purview of the vice president
- Provide the chairman of the nominating committee with potential candidates for Council membership

Changes in Organizational Structure

In 2002, the NCRP President and Board of Directors developed plans for reorganization of the scientific program area committees that are designed to increase their effectiveness and reduce the cost of their operations. The primary changes involve: (1) combining the program area committees on Environmental Issues and Radioactive and Mixed Waste into a single program area committee on Environmental Radioactive Waste Issues, (2) the conversion of the program area committees on Public Policy and Risk Communication and Radiation Measurement and Dosimetry into the role of advisory committees, and (3) the incorporation of scientific committees that fall within the category of Other Scientific Committees into the five program area committees.

Major steps were taken in 2002 toward implementing these changes, all of which will be completed in 2003. The program area committees and advisory committees that will be in place during 2003, and the responsible Vice Presidents, are:

Program Area Committees:

Basic Criteria, Epidemiology, Radiobiology, and Risk, R. Julian Preston
Environmental Radioactive Waste Issues, F. Ward Whicker
Nonionizing Radiation, Ronald C. Petersen
Operational Radiation Safety, Susan M. Langhorst
Radiation Protection in Medicine, Henry D. Royal

Advisory Committees:

Public Policy and Risk Communication, Susan D. Wiltshire
Radiation Measurement and Dosimetry, Thomas F. Gesell

Basic Criteria, Epidemiology, Radiobiology, and Risk

Vice President, R. Julian Preston

Key Functions of Scientific Committee 1

- Evaluate and approve all NCRP committee draft recommendations on exposure limits.
- Evaluate new epidemiological and radiobiological data and determine their potential effect on human risk coefficients for radiation protection.

Members of Scientific Committee 1

R. Julian Preston, *Chairman, 2002–*
S. James Adelstein, *Chairman, 1992–2002*
Bruce B. Boecker
R.J. Michael Fry
Raymond A. Guilmette
Eric J. Hall
Kenneth R. Kase
James C. Lin
John B. Little
Henry D. Royal
Roy E. Shore
F. Ward Whicker
Susan D. Wiltshire
Warren K. Sinclair, *Advisor*
Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Lung cancer risks from inhaled radionuclides

Active Scientific Committees Under SC 1

SC 1-4 Extrapolation of Risks from Non-Human Experimental Systems to Man

Status: Revising after critical review

David G. Hoel, *Chairman*

Bruce A. Carnes

Robert L. Dedrick

Douglas Grahn

William C. Griffith

Peter G. Groer

R. Julian Preston

R.J. Michael Fry, *Advisor/Liaison*

William M. Beckner, *NCRP Staff*

SC 1-7 Information Needed to Make Radiation Protection Recommendations for Travel Beyond Low-Earth Orbit

Status: Middle drafting stage

Lawrence W. Townsend, *Chairman*

Eleanor A. Blakely

Leslie A. Braby

Francis A. Cucinotta

Stanley B. Curtis

Charles E. Land

Don F. Smart

R.J. Michael Fry, *Advisor*

William M. Beckner, *NCRP Staff*

SC 1-8 Risk to Thyroid from Ionizing Radiation

Status: Preparing for Council review

Henry D. Royal, *Chairman*

David V. Becker

A. Bertrand Brill

Roy E. Shore

R. Michael Tuttle

Bruce W. Wachholz

David A. Weber

Pasquale D. Zansonic

Elaine Ron, *Advisor*

Xiaonan Xue, *Consultant*

William M. Beckner, *NCRP Staff*



SC 1-10 Review of Cohen's Radon Research Methods

Status: Preparing for critical review

Clark Heath, *Chairman*

Peter Bond

David G. Hoel

Charles B. Meinhold

Laura J. Atwell, *NCRP Staff*

William M. Beckner, *NCRP Staff*

Thomas S. Tenforde, *NCRP Staff*

SC 1-11 (II) Radiation Protection Advice for Pulsed Fast Neutron Analysis System Used in Security Surveillance (ALARA and Radiation Safety Plan)

Status: Preparing for critical review

Leslie A. Braby, *Chairman*

Lawrence R. Greenwood

Charles B. Meinhold

Susan D. Wiltshire

Marvin Rosenstein, *NCRP Staff Consultant*

SC 1-11 (III) Radiation Protection Advice for Pulsed Fast Neutron Analysis System Used in Security Surveillance (Dosimetry and Measurement Procedures)

Status: Early drafting stage

Leslie A. Braby, *Chairman*

David M. Gilliam

Lawrence R. Greenwood

Charles B. Meinhold

Marvin Rosenstein, *NCRP Staff Consultant*

SC 1-12 Exposure Limits for Security Surveillance Devices

Status: Late drafting stage

Kenneth L. Miller, *Chairman*

David J. Brenner

Frank Cerra

Joel O. Lubenau

R. Julian Preston

Marvin Rosenstein, *NCRP Staff Consultant*

Published in 2002

A presidential report, *Advice for Pulsed Fast Neutron Analysis System Used in Security Surveillance*, was issued in September 2002. The Report was drafted by Scientific Committee 1-11(I) under the Chairmanship of Leslie A. Braby.

Operational Radiation Safety

Vice President, Susan M. Langhorst

Key Functions of Scientific Committee 46

- Serve as a national resource for information on operational radiation safety.
- Formulate guidance regarding the application of operational radiation safety principles.

Members of Scientific Committee 46

Susan M. Langhorst, *Chairman, 2002–*
Kenneth R. Kase, *Chairman, 1995–2002*
Mary L. Birch
John R. Frazier
Steven M. Garry
Kathryn A. Higley
Joel O. Lubenau
Kenneth L. Miller
David S. Myers
John W. Poston, Sr.
Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Air monitoring
- Design of facilities and installed equipment for handling unsealed radioactive materials
- Investigation of radiological incidents
- Radiation exposures resulting from air travel
- Radiation protection guidelines for industrial accelerators and irradiators
- Radiation protection in biomedical/biological research
- Self-assessment of radiation safety program
- Irradiation to inhibit restenosis (joint with SC 91)

Active Scientific Committees Under SC 46

SC 46-8 Radiological Protection at Accelerator Facilities

Status: Preparing printer's manuscript

Ralph H. Thomas, *Chairman*

W. Robert Casey

Jack Donald Cossairt

Keran O'Brien

Norman Rohrig

Lester A. Slaback

Geoffrey Stapleton

David R. Perry, *Advisor*

Constantine J. Maletskos, *NCRP Staff Consultant*

SC 46-13 Design of Facilities for Medical Radiation Therapy

Status: Middle drafting stage

James A. Deye, *Chairman*

Raymond K. Wu, *Vice Chairman*

Peter J. Biggs

Jeffery Kleck

Richard C. McCall

Patton H. McGinley

James E. Rodgers

Robert O. Gorson, *Consultant*

Marc Edwards, *Liaison*

Kenneth R. Kase, *Liaison*

Marvin Rosenstein, *NCRP Staff Consultant*

SC 46-16 Radiation Protection in Veterinary Medicine

Status: Revising after Council review

Kenneth R. Kase, *Chairman*

David D. Barbee

Kenneth L. Miller

John W. Poston, Sr.

Michael A. Walker

Ronald P. Wilson

Marvin Rosenstein, *NCRP Staff Consultant*

SC 46-17 Radiation Protection in Educational Institutions

Status: Committee membership being developed

Susan M. Langhorst, *Chairman*

Kenneth L. Miller

John W. Poston, Sr.

Stephanie J. Alleman, *NCRP Contact*

Published in 2002

NCRP Report No. 142, *Operational Radiation Safety Program for Astronauts in Low-Earth Orbit: A Basic Framework*, was published in November 2002. The Report was drafted by Scientific Committee 46-15 under the chairmanship of Richard J. Vetter.

Environmental Issues

Vice President, F. Ward Whicker

Key Functions of Scientific Committee 64

- Serve as a national resource for environmental information and data.
- Prepare scientific reports, commentaries and statements, that can be used as fundamental scientific references dealing with radionuclides in the environment.

Secondary Functions of Scientific Committee 64

- Be an independent resource to provide information to make decisions about environmental exposure from radionuclides and resulting doses and risk.
- Establish fundamental principles and concepts with regard to environmental radiological issues.

Members of Scientific Committee 64

F. Ward Whicker, *Chairman, 2002–*

John E. Till, *Chairman, 1995–2002*

Melvin W. Carter, *Chairman Emeritus*

Frank J. Congel

E. Gail de Planque

Helen A. Grogan

Bernd Kahn

Jerome S. Puskin

Chris G. Whipple

Jeffrey Wong

Keith F. Eckerman, *Advisor*

Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Decontamination and decommissioning of facilities
- Radiation protection criteria for plants and animals

- Risk-based corrective action in remediation of contaminated ecosystems
- Symposium on comparison of methods for estimating radiological and chemical risks
- Symposium on comparison of regulatory approaches to management of radiological and chemical risks
- Usage factors for environmental dose calculations
- Case studies and lessons learned from remediation of sites and facilities with radioactive contamination
- Assessment of measurement methodologies for environmental indicators of past releases (joint with SC 93)
- Contaminated ecosystems: Remediation or management

Active Scientific Committees Under SC 64

SC 64-22 Design of Effective Effluent and Environmental Monitoring Programs

Status: Late drafting stage

Bernd Kahn, *Chairman*

James D. Berger

John Glissmeyer

Carl V. Gogolak

Norbert Golchert

Richard E. Jaquish

Janet A. Johnson

Shyam K. Nair

Bruce A. Napier, *Consultant*

E. Ivan White, *NCRP Staff Consultant*

SC 64-23 Cesium in the Environment

Status: Late drafting stage

F. Ward Whicker, *Chairman*

Charles T. Garten, Jr.

David M. Hamby

Kathryn A. Higley

Thomas G. Hinton

Daniel Kaplan

David J. Rowan

R. Gene Schreckhise

Margaret MacDonell, *Consultant*

E. Ivan White, *NCRP Staff Consultant*



Radioactive and Mixed Waste

Vice President, F. Ward Whicker

Key Functions of Scientific Committee 87

- Help formulate NCRP policy on disposal of radioactive and mixed waste.
- Encourage scientific and technical discourse on the disposal of radioactive and mixed waste including environmental and human risk from disposal.
- Encourage scientific and technical discourse on the cost-benefit of activities generating radioactive and mixed waste.
- Encourage scientific and technical discourse on the classification of radioactive and mixed waste.

Members of Scientific Committee 87

F. Ward Whicker, *Chairman, 2002–*
Michael T. Ryan, *Chairman, 1998–2002*
S.Y. Chen
Allen G. Croff
William P. Dornsife
Donald G. Jacobs
David C. Kocher
Matthew W. Kozak
Martin J. Letourneau
Dade W. Moeller
Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Clearance as a radiation protection strategy for radioactive material management
- Development of an NCRP commentary on clearance as a radiation protection strategy for radioactive material management
- Development of a risk assessment and risk management parameter handbook
- Develop an NCRP position on the use of risk management concepts
- Development of an NCRP document on criteria for unrestricted release of slightly radioactive solid materials
- Need for financial support of academic health physics programs

Active Scientific Committees Under SC 87

SC 87-1 Waste Avoidance and Volume Reduction

Status: Preparing printer's manuscript

William P. Dornsife, *Chairman*

Russell S. Garcia

Francis X. Masse

John Psaras

Edward H. Rau

Anthony Wolbarst

Walter Hipsher, *Consultant*

E. Ivan White, *NCRP Staff Consultant*

SC 87-3 Performance Assessment of Near Surface Radioactive Waste Facilities

Status: Being revised after Council review

David C. Kocher, *Chairman*

William E. Kennedy

Matthew W. Kozak

Vern C. Rogers

Roger R. Seitz

Terrence Sullivan

E. Ivan White, *NCRP Staff Consultant*

SC 87-5 Risk Management Analysis for Decommissioned Sites

Status: Early drafting stage

Daniel J. Strom, *Chairman*

Lynn R. Anspaugh

James Flynn

F. Owen Hoffman

David C. Kocher

Paul A. Locke

Paul J. Merges

Bruce A. Napier

Lauren Zeise

E. Ivan White, *NCRP Staff Consultant*

Published in 2002

NCRP Report No. 139, *Risk-Based Classification of Radioactive and Hazardous Chemical Wastes*, was published in December 2002. The Report was drafted by Scientific Committee 87-2 under the chairmanship of Allen G. Croff.

NCRP Report No. 141, *Managing Potentially Radioactive Scrap Metal*, was published in November 2002. The Report was drafted by Scientific Committee 87-4 under the chairmanship of S.Y. Chen.



Nonionizing Radiation

Vice President, Ronald C. Petersen

Key Functions of Scientific Committee 89

- Examine and evaluate both theoretical and applied aspects of dosimetry and exposure assessment.
- Examine and evaluate mechanisms of interaction of nonionizing radiation with biological systems, including humans.
- Identify biological responses and human health effects.
- Establish recommendations on acceptable exposure levels in occupational, medical and public environments.
- Examine and evaluate procedures for mitigation of exposure in public and occupational settings.

Members of Scientific Committee 89

Ronald C. Petersen, *Chairman*
James E. Cleaver
Arthur W. Guy
David G. Hoel
James C. Lin
David H. Sliney
Jan A.J. Stolwijk
Richard A. Tell
Marvin C. Ziskin
Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Effects of exposure to ultraviolet radiation

Active Scientific Committees Under SC 89

SC 89-3 Biological Effects of Extremely-Low-Frequency Electric and Magnetic Fields*

Status: Draft report being prepared for Council review

W. Ross Adey, *Chairman*

Larry E. Anderson

Carl F. Blackman

David O. Carpenter

William E. Feero

Marvin E. Frazier

Richard H. Lovely

Richard A. Luben

Martin Misakian

Richard G. Stevens

Charles F. Ehret, *Advisor*

Kenneth R. Groh, *Advisor*

James E. Morris, *Consultant*

Gayle Woloshak, *Consultant*

Constantine J. Maletskos, *NCRP Staff Consultant*

*The Board of Directors put the work of this Committee on hold at its December 2001 meeting.

SC 89-4 Biological Effects of Modulated Radiofrequency Fields

Status: Draft commentary being revised after review by the Board of Directors

Om P. Gandhi, *Chairman*

John D'Andrea

Kenneth R. Foster

Arthur W. Guy

Don R. Justesen

Indira Nair

Asher R. Sheppard

Constantine J. Maletskos, *NCRP Staff Consultant*

SC 89-5 Biological Effects of Radiofrequency Electromagnetic Fields

Status: Middle drafting stage

James C. Lin, *Chairman*

Elizabeth Balcer-Kubiczek

Paul A. Bottomly

Faith G. Davis

H. Keith Florig

Om P. Gandhi

Mary E. Gilbert

William G. Lotz

Eleanor R. Adair, *Consultant*

Patricia A. Buffler, *Consultant*

Chung-Kwang Chou, *Consultant*

George H. Harrison, *Consultant*

Constantine J. Maletskos, *NCRP Staff Consultant*

Published in 2002

A presidential report, *Wireless Telecommunications Safety Issues for Building Owners and Managers*, was issued in December 2002. This Report was drafted by Scientific Committee 89-6 under the chairmanship of Thomas S. Tenforde.

Radiation Protection in Medicine

Vice President, Henry D. Royal

Key Functions of Scientific Committee 91

- Identify areas with which NCRP should be concerned in radiation protection of patients in medical, dental and chiropractic practice.
- Examine and evaluate techniques and procedures to eliminate unnecessary radiation exposure to the patient.
- Examine and evaluate training of medical personnel in radiation protection.

Members of Scientific Committee 91

Henry D. Royal, *Chairman, 2002–*
Fred A. Mettler, Jr., *Chairman, 1992–2002*
John W. Brand
Jerrold T. Bushberg
Sarah S. Donaldson
Marc Edwards
J. Anthony Seibert
Marilyn J. Siegel
Diane M. Twickler
Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Medical examination of workers
- Assessment of exposure from therapy
- Ethical issues in biomedical research involving the exposure of humans to ionizing radiation
- Radiological protection standards for studies involving radiation exposure of human research subjects
- Exposure of the United States population from diagnostic medical radiation with emphasis on female breast



Active Scientific Committees Under SC 91

SC 91-1 Precautions in the Management of Patients Who Have Received Therapeutic Amounts of Radionuclides

Status: Middle drafting stage

Jean St. Germain, *Chairman*

Edward B. Silberstein

Jeffrey F. Williamson

Pasquale Zanzonico

Richard J. Vetter, *Consultant*

Jerrold T. Bushberg, *Liaison*

Sarah S. Donaldson, *Liaison*

William M. Beckner, *NCRP Staff*

SC 91-2 Radiation Protection in Dentistry

Status: Revising following Council review

John W. Brand, *Co-Chairman*

S. Julian Gibbs, *Co-Chairman*

Marc Edwards

Jerald O. Katz

Alan G. Lurie

Stuart C. White

W. McDavid Doss, *Consultant*

Marvin Rosenstein, *NCRP Staff Consultant*

Public Policy and Risk Communication

Vice President, Susan D. Wiltshire

Key Functions of Scientific Committee 92

- Evaluate the use of scientific knowledge about radiation in the development of policy.
- Evaluate the effectiveness of communication among scientists, policy makers, and the public on issues involving radiation.
- Serve as a resource to any scientific committees preparing reports that may be used as the basis for public policy, decision making and public communication.
- Develop and implement activities that encourage the interest and involvement of a broad spectrum of individuals and groups who can contribute to or benefit from NCRP studies and reports.
- Identify policy implications of topics NCRP is investigating and of methods for effectively communicating results to policy-makers.

Members of Scientific Committee 92

Susan D. Wiltshire, *Chairman*
H. Keith Florig
LeRoy Moore
Allan C.B. Richardson
Paul Slovic
James P. Thomas
Richard J. Vetter
Chris G. Whipple
Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Allocation of resources to obtain optimal dose reduction

Radiation Measurement and Dosimetry

Vice President, Thomas F. Gesell

Key Functions of Scientific Committee 93

- Evaluate the field of radiation measurement as it pertains to the function of the committee.
- Serve as a source of information to any scientific committees preparing reports that include radiation measurement.
- Maintain liaison with other organizations such as ICRP, ICRU, CIRMS, and professional societies.

Members of Scientific Committee 93

Thomas F. Gesell, *Chairman, 2002–*
 Harold L. Beck, *Chairman, 1994–2002*
 Leslie A. Braby
 Paul M. DeLuca
 John F. Dicello
 Fred M. Dietrich
 Keith F. Eckerman
 Naomi H. Harley
 Glenn F. Knoll
 Ravinder Nath
 Steven L. Simon
 Laura J. Atwell, *NCRP Contact*

Authorized but Unfunded Activities

- Update of NCRP Report No. 58 "*Handbook of Radioactivity Measurements*"
- Biological dosimetry
- Guidance on measurements for quality assurance and verification for conformal radiation therapy
- Aerosol measurements
- Radiation measurement accuracy
- Background levels of radionuclides in the environment
- Evaluation of ultrasensitive measurement techniques
- Assessment of measurement methodologies for environmental indicators of past releases
- Quality assurance for brachytherapy

Other Scientific Committees

SC 9 Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies Up to 10 MeV

Status: Revising after Council review

Benjamin Archer, *Co-Chairman*

Joel E. Gray, *Co-Chairman*

Robert L. Dixon

William Eide, Jr.

Lincoln B. Hubbard

Eric E. Kearsley

Robert M. Quillin

Douglas R. Shearer

Douglas J. Simpkin

Andrew K. Poznanski, *Consultant*

Marvin Rosenstein, *NCRP Staff Consultant*

SC 57-15 Uranium Risks*

Status: Revising after Council review

John R. Johnson, *Chairman*

Bruce B. Boecker

James S. Bogard

Leslie W. Cole

Arthur F. Eidson

Ernest C. Foulkes

Shirley A. Fry

William M. Beckner, *NCRP Staff*

SC 57-17 Radionuclide Dosimetry Models for Wounds*

Status: Preparing for Council review

Bryce D. Breitenstein, Jr., *Chairman*

Patricia W. Durbin

Ronald E. Goans

Raymond A. Guilmette

John J. Russell

Richard E. Toohey

Richard A. Clark, *Advisor*

Jean Piechowski, *Advisor*

Robert Bistline, *Consultant*

Melissa A. McDiarmid, *Consultant*

William M. Beckner, *NCRP Staff*

*These committees fall under the guidance of Bruce B. Boecker, Scientific Advisor for Internal Emitters.

SC 72 Radiation Protection in Mammography

Status: Revising after Council review

Lawrence N. Rothenberg, *Chairman*

Stephen A. Feig

Arthur G. Haus

R. Edward Hendrick

Geoffrey R. Howe

John L. McCrohan

Edward A. Sickles

Martin Yaffe

Wende W. Young

Arthur G. Haus, *NCRP Staff Consultant*

SC 85 Risk of Lung Cancer from Radon

Status: Revising after Council review

Naomi H. Harley, *Chairman*

Douglas B. Chambers

Fred T. Cross

Helen Evans

Aurel Goodwin

Jay H. Lubin

John S. Neuberger

Janet B. Schoenberg

Edith S. Robbins, *Consultant*

Peter G. Groer, *Advisor*

Howard L. Kusnetz, *Advisor*

William M. Beckner, *NCRP Staff*

Published in 2002

NCRP Report No. 140, *Exposure Criteria for Medical Diagnostic Ultrasound: II. Criteria Based on All Known Mechanisms*, prepared by Scientific Committee 66 under the chairmanship of Wesley L. Nyborg.

Lauriston S. Taylor Lectures

Year	Title	Lecturer
2002	Developing Mechanistic Data for Incorporation into Cancer Risk Assessment: Old Problems and New Approaches	R. Julian Preston
2001	Assuring the Safety of Medical Diagnostic Ultrasound	Wesley L. Nyborg
2000	Administered Radioactivity: <i>Unde Venimus Quoque Imus</i>	S. James Adelstein
1999	Back to Background	Naomi H. Harley
1998	From Chimney Sweeps to Astronauts: Cancer Risks in the Work Place	Eric J. Hall
1997	Radionuclides in the Body: Meeting the Challenge	William J. Bair
1996	70 Years of Radiation Genetics: Fruit Flies, Mice and Humans	Seymour Abrahamson
1995	Certainty and Uncertainty in Radiation Research	Albrecht M. Kellerer
1994	Mice, Myths, and Men	R.J. Michael Fry
1993	Science, Radiation Protection and the NCRP	Warren K. Sinclair
1992	Dose and Risk in Diagnostic Radiology: How Big? How Little?	Edward W. Webster
1991	When is a Dose Not a Dose?	Victor P. Bond
1990	Radiation Protection and the Internal Emitter Saga	J. Newell Stannard
1989	Radiobiology and Radiation Protection: The Past Century and Prospects for the Future	Arthur C. Upton
1988	How Safe is Safe Enough?	Bo Lindell
1987	How to be Quantitative about Radiation Risk Estimates	Seymour Jablon
1986	Biological Effects on Non-Ionizing Radiations: Cellular Properties and Interactions	Herman P. Schwan
1985	Truth (and Beauty) in Radiation Measurements	John H. Harley
1984	Limitation and Assessment in Radiation Protection	Harald H. Rossi
1983	The Human Environment – Past, Present and Future	Merril Eisenbud

1982	Ethics, Trade-Offs and Medical Radiation	Eugene L. Saenger
1981	How Well Can We Assess Genetic Risk? Not Very	James F. Crow
1980	From "Quantity of Radiation" and "Dose" to "Exposure" and "Absorbed Dose" – An Historical Review	Harold O. Wyckoff
1979	Radiation Protection – Concepts and Trade Offs	Hymer L. Friedell
1978	Why be Quantitative About Radiation Risk Estimates?	Sir Edward Pochin
1977	The Squares of the Natural Numbers in Radiation Protection	Herbert M. Parker

2002 Lauriston S. Taylor Lecture

The Twenty-Sixth Lauriston S. Taylor Lecture prepared by R. Julian Preston, *Developing Mechanistic Data for Incorporation into Cancer Risk Assessment: Old Problems and New Approaches*, will be printed in *Health Physics*.

Collaborating Organizations

Organizations or groups of organizations that are national in interest and are concerned with scientific problems involving radiation quantities, units, measurements and effects, or radiation protection may be admitted to collaborating status by the NCRP. Collaborating Organizations provide a means by which the NCRP can gain input into its activities from a wider segment of society. At the same time, the relationships with the Collaborating Organizations facilitate wider dissemination of information about the Council's activities, interests and concerns. Collaborating Organizations have the opportunity to comment on draft reports at the time that drafts are submitted to the members of the Council. This is intended to capitalize on the fact that Collaborating Organizations are in an excellent position to both contribute to the identification of what needs to be treated in NCRP reports and to identify problems that might result from proposed recommendations. The Collaborating Organizations for the year 2002 are:

Organization	Contact Person
Agency for Toxic Substances and Disease Registry	Robert L. Spengler
American Academy for Dermatology	Samuel S. Flint, Robert O. Gorson
American Academy of Environmental Engineers	William C. Anderson
American Academy of Health Physics	James E. Tarpinian
American Association of Physicists in Medicine	Sal Trofi
American College of Medical Physics	Rick Guggolz, Lawrence N. Rothenberg
American College of Nuclear Physicians	Bennett Greenspan, Virginia Pappas
American College of Occupational and Environmental Medicine	Joel R. Bender, Thomas S. Ely
American College of Radiology	Harvey L. Neiman
American Dental Association	James Bramson
American Industrial Hygiene Association	O. Gordon Banks, Norris Johnson
American Institute of Ultrasound in Medicine	Carmine M. Valente, Marvin C. Ziskin
American Insurance Services Group	

American Medical Association	Barry Dickinson, James Lyznicki
American Nuclear Society	Bernard L. Cohen, Shawn Coyne-Naubett, Harry Bradley
American Pharmaceutical Association	Anne Burns
American Podiatric Medical Association	Pamela J. Coleman, Glenn B. Gastwirth
American Public Health Association	Mohammad Akhter
American Radium Society	Robert O. Gorson, J. Frank Wilson
American Roentgen Ray Society	Susan Cappitelli
American Society for Therapeutic Radiology and Oncology	Gregg Robinson, Laura Thevenot
American Society of Emergency Radiology	Stephen R. Baker
American Society of Health-System Pharmacists	Henri Manasse, Jr.
American Society of Radiologic Technologists	F. Lynn May, Greg Morrison
Association of Educators in Radiological Sciences, Inc.	Valerie Christensen
Association of University Radiologists	Josette Szalko
Bioelectromagnetics Society	Frank S. Prato
Campus Radiation Safety Officers	Ninni Jacob
College of American Pathologists	Carol Kowalski, Myron Pollycove, Lee Van Breman
Conference of Radiation Control Program Directors, Inc.	David Allard, Patricia Gorman
Council on Radionuclides and Radiopharmaceuticals	Henry Kramer, Leonard R. Smith
Defense Threat Reduction Agency	D.M. Schaeffer
Electric Power Research Institute	Kurt E. Yeager
Federal Communications Commission	Robert F. Cleveland, Jr.
Federal Emergency Management Agency	Vernon L. Wingert
Genetics Society of America	Seymour Abrahamson
Health Physics Society	John R. Frazier
Institute of Electrical and Electronics Engineers, Inc.	Eleanor R. Adair, Mary Ward-Callan
Institute of Nuclear Power Operations	Steve Driscoll, James T. Rhodes
International Brotherhood of Electrical Workers	William F. Paul

National Aeronautics and Space Administration	NASA Administrator, Walter Schimmerling
National Association of Environmental Professionals	Clay E. Easterly
National Electrical Manufacturers Association	James E. Howard, Stephen Vastagh
National Institute for Occupational Safety and Health	William G. Lotz
National Institute of Standards and Technology	Arden L. Bement, David Gilliam
Nuclear Energy Institute	Ralph Andersen
Office of Science and Technology	John Marburger
Paper, Allied-Industrial, Chemical and Energy Workers International Union	Mark Griffon, Herman Potter
Radiation Research Society	Edward R. Epp, W. Gillies McKenna
Radiological Society of North America	Dave Fellers, Fred A. Mettler, Jr., Robin Cantor
Society for Risk Analysis	Lise Swanson
Society of Chairmen of Academic Radiology Departments	Virginia Pappas, Henry D. Royal
Society of Nuclear Medicine	Carol B. Benson
Society of Radiologists in Ultrasound	Andrew Sonin
Society of Skeletal Radiology	Ramachandra K. Bhat
U.S. Air Force	Surgeon General U.S. Army, William B. Johnson
U.S. Army	Michael Adess
U.S. Coast Guard	Secretary of Energy, C. Rick Jones
U.S. Department of Energy	Richard H. Broun, Joel Segal
U.S. Department of Housing and Urban Development	Chia Ting Chen
U.S. Department of Labor	James K. O'Steen
U.S. Department of Transportation	EPA Administrator, Elizabeth Cotsworth
U.S. Environmental Protection Agency	Chairman, Navy Radiation Safety Committee
U.S. Navy	NRC Chairman, Harriet Karragiannis, Cheryl A. Trottier
U.S. Nuclear Regulatory Commission	Petro Shandruk
U.S. Public Health Service	John M. Walsh, Jr.
Utility Workers Union of America	

Special Liaison Organizations

Special Liaison relationships are established with various organizations outside of the United States that have an interest in radiation protection and measurements. This relationship provides: (1) an opportunity for participating organizations to designate an individual to provide liaison between the organization and the NCRP; (2) that the individual designated will receive copies of draft NCRP reports (at the time that these are submitted to the members of the Council) with an invitation to comment but not vote; and (3) that new NCRP efforts might be discussed with liaison individuals as appropriate, so that they might have an opportunity to make suggestions on new studies and related matters. The Special Liaison Organizations for 2002 are:

Organization	Contact Person
Australian Radiation Laboratory	Keith H. Lokan
Bundesamt für Strahlenschutz (Germany) (Federal Office for Radiation Protection)	Wolfram König
Canadian Nuclear Safety Commission	J.K. Pereira
Central Laboratory for Radiological Protection (Poland)	Slawomir Sterlinski
China Institute for Radiation Protection	Huating Yang
Commissariat à l'Energie Atomique (France)	Annie Sugier
Commonwealth Scientific Instrumentation Research Organization (Australia)	Stan Barnett
European Commission	Hans Forsström
Health Council for the Netherlands	Wim Passchier
International Commission on Non-Ionizing Radiation Protection	Alastair McKinlay
Japan Radiation Council	Shigenabu Nagataki
Korea Institute of Nuclear Safety	Kwang Sik Choi
National Radiological Protection Board (United Kingdom)	Roger Clarke
Russian Scientific Commission on Radiation Protection	Anatoly F. Tsyb
South African Forum for Radiation Protection	D. van As
World Association for Nuclear Operators	Edgar Hux

Corporate Sponsors

The Corporate Sponsor's Program facilitates the interchange of information and ideas, and corporate sponsors provide valuable fiscal support for the NCRP program. The Corporate Sponsors for 2002 are:

Organization	Contact Person
3M Corporate Health Physics	Duane C. Hall
Amersham Health	Mark Doruff
Duke Energy Corporation	Larry Haynes
ICN Biomedicals, Inc.	Sander C. Perle
Landauer, Inc.	R. Craig Yoder
Nuclear Energy Institute	Ralph Andersen
Philips Medical Systems	Jack Price
Southern California Edison Company	Richard Warnock

Review Process

The review process for draft reports has been elaborate and comprehensive. It usually includes, first, a review by a selected group of "critical reviewers." Second, following modification of the draft on the basis of the comments of the critical reviewers, if critical reviewers were utilized, the report is submitted for review to the full Council membership (95 members), Honorary members (43 members), Collaborating organizations (63), and Special Liaison organizations (16). At the time a report is submitted for Council review it is also placed on the NCRP's website for public comment (<http://www.ncrp.com>). Further modification of draft reports on the basis of the comments received follows, with the goal being to reach a scientific consensus on the material included in the report. An NCRP report can be published only if there are no more than two remaining disapprovals by members of the Council after resolution of review comments.

In addition to full reports, NCRP also produces statements, commentaries, and presidential reports. Statements are brief documents (four or fewer pages) that succinctly address topics of contemporary interest and importance for radiation protection. The review and approval process for statements is the same as for reports. NCRP commentaries are documents that provide preliminary evaluations, critiques, reviews and results of exploratory studies, or extensions of previously published NCRP reports on an accelerated schedule when time for the normal review process is not available. Approval is by the Board of Directors with involvement by other Council members to an extent dependent on the time available. Presidential reports are documents on specific issues in radiation health protection that are developed by a scientific committee, reviewed by members of Council and other subject-area experts as needed, and approved for publication by the President.

Annual Meetings

Year	Topic
2002	Where the New Biology Meets Epidemiology: Impact on Radiation Risk Estimates
2001	Fallout from Atmospheric Nuclear Tests—Impact on Science and Society
2000	Ionizing Radiation Science and Protection in the 21st Century
1999	Radiation Protection in Medicine: Contemporary Issues
1998	Cosmic Radiation Exposure of Airline Crews, Passengers and Astronauts
1997	The Effects of Pre- and Postconception Exposure to Radiation
1996	Implications of New Data on Radiation Cancer Risk
1995	Environmental Dose Reconstruction and Risk Implications
1994	Extremely-Low-Frequency Electromagnetic Fields: Issues in Biological Effects and Public Health
1993	Radiation Science and Societal Decision Making
1992	Radiation Protection in Medicine
1991	Genes, Cancer and Radiation Protection
1990	Health and Ecological Implications of Radioactively Contaminated Environments
1989	Radiation Protection Today—The NCRP at Sixty Years
1988	Radon
1987	New Dosimetry at Hiroshima and Nagasaki and Its Implications for Risk Estimates
1986	Nonionizing Electromagnetic Radiations and Ultrasound
1985	Radioactive Waste
1984	Some Issues Important in Developing Basic Radiation Protection Recommendations
1983	Environmental Radioactivity
1982	Radiation Protection and New Medical Diagnostic Approaches
1981	Critical Issues in Setting Radiation Dose Limits
1980	Quantitative Risk in Standards Setting
1979	Perceptions of Risk

2002 Annual Meeting

The Thirty-Eighth Annual Meeting of the NCRP was held April 10-11, 2002 in Arlington, Virginia. The topic of the meeting was *Where the New Biology Meets Epidemiology: Impact on Radiation Risk Estimates*. The sessions and presentations were as follows:

The New Biology

The State of the Art in the 1990s: NCRP Report No. 136 on the Scientific Bases for Linearity, Arthur C. Upton

Radiation-Induced Genomic Instability In Vitro: Implications for Radiation Risk, William F. Morgan

Genomic Instability, Susceptibility Genes, and Carcinogenesis, Robert L. Ullrich

The Bystander Effect, Eric J. Hall

Monitoring Human Radiation Exposure by Gene Expression Profiling: Possibilities and Pitfalls, Sally A. Amundson

The Epidemiology

Dose Response and Temporal Patterns of Radiation-Induced Cancer Risks, Dale L. Preston

Cancer Risks from Medical Radiation, Elaine Ron

Diagnostic X Rays, DNA Repair Genes, and Childhood Leukemia, Claire Infante-Rivard

Genetic Effects of Radiotherapy for Childhood Cancer, John D. Boice, Jr.

Tracking the Errant Cell After the Atomic Bombings: What Went Wrong?, Kei Iwamoto

Where Do We Go From Here?

How Radiation-Induced Phenotypes Contribute to Neoplastic Progression, Mary Helen Barcellos-Hoff

Developing a Scientific Basis for Radiation Risk Estimates: The Goal of the DOE Low Dose Research Program, Antone L. Brooks

The Impact of the New Biology on Radiation Risks in Space, John F. Dicello

Do Low Dose-Rate Bystander Effects Influence Domestic Radon Risks?, David J. Brenner

Serving on the Program Committee for the 2002 Annual Meeting were: Eric J. Hall, *Chairman*; Antone L. Brooks, John F. Dicello, Dale L. Preston, R. Julian Preston, Elaine Ron, Robert L. Ullrich, and Marco A. Zaider.

Annual Report

N

CRCP

APPENDICES

Annual Report



Appendix 1: Finances

Exhibit A
Statement of Assets, Liabilities and Net Assets
(unaudited, December 31, 2002)

	Operating Fund	Contingency Fund	Capital Campaign Fund	Total
Assets				
Cash on deposit	(55,397)	56,468	2,786	3,857
Investments (at market)		780,534	103,587	884,121
Cash on hand	300			300
Accounts receivable				
Contracts	83,791			83,791
Grants	78,370			78,370
Publications sales (net of allowance for doubtful accounts of 1,672)	15,046			15,046
International Commission on Radiation Units and Measurements	29,520			29,520
International Society of Radiology	1,791			1,791
Other	38			38
Accrued interest receivable		5,989		5,989
Donated artwork		5,500		5,500
Inventory				
Publications	259,167			259,167
Postage	5,749			5,749
Prepaid expenses	13,438			13,438

Annual Report

	Operating Fund	Contingency Fund	Capital Campaign Fund	Total
Fixed assets (net of accumulated depreciation of \$248,804)	90,047			90,047
Total assets	521,860	848,491	106,373	1,476,724
Liabilities				
Accounts payable	90,896			90,896
Lease payable	63,664			63,664
Accrued annual leave	80,665			80,665
Accrued salary	4,703			4,703
Accrued post retirement benefit	266,524			266,524
Deferred rent	12,296			12,296
Line of credit payable	201,047			201,047
Pension contribution	5,706			5,706
Total liabilities	725,501			725,501
Net Assets (deficit)				
Unrestricted	(203,641)	848,491		644,850
Temporarily restricted			106,373	106,373
Total net assets (deficit)	(203,641)	848,491	106,373	751,223
Total liabilities and net assets	521,860	848,491	106,373	1,476,724

CFCRP

Exhibit B
Statement of Activities
Operating Fund

(unaudited, December 31, 2002)

	Total	Operations	Publications Section
Revenue			
Contracts			
Bechtel	11,433	11,433	—
McDonald's Corporation	39,500	39,500	—
Nuclear Regulatory Commission	28,199	28,199	—
Sensor Concepts and Applications, Inc.	73,997	73,997	—
University of Pittsburgh	25,000	25,000	—
U.S. Navy	95,729	95,729	—
Contributions			
American Academy of Oral and Maxillofacial Radiology	1,000	1,000	—
American Association of Physicists in Medicine	3,500	3,500	—
American College of Radiology Foundation	25,000	25,000	—
American College of Medical Physics	500	500	—
American Nuclear Society	3,000	3,000	—
American Osteopathic College of Radiology	275	275	—
American Society for Therapeutic Radiology and Oncology	5,000	5,000	—
American Society of Radiologic Technologist	6,000	6,000	—
Council on Radionuclides and Radiopharmaceuticals	2,000	2,000	—

Annual Report

	Total	Operations	Publication Section
Health Physics Society	20,000	20,000	—
Health Research Foundation	2,500	2,500	—
Landauer	3,000	3,000	—
Radiological Society of North America	20,000	20,000	—
Corporate Sponsors			
3M	5,000	5,000	—
Amersham Health	5,000	5,000	—
Duke Energy Corporation	5,000	5,000	—
Landauer, Inc.	5,000	5,000	—
Nuclear Energy Institute	5,000	5,000	—
Southern California Edison	5,000	5,000	—
Contributions - Individual	15,500	15,500	—
Grants			
Defense Threat Reduction Agency	87,308	87,308	—
Department of Energy	197,639	197,639	—
Environmental Protection Agency	103,565	103,565	—
National Aeronautics and Space Administration	86,089	86,089	—
National Cancer Institute	228,303	228,303	—
Nuclear Regulatory Commission	64,897	64,897	—
Payments for Services			
International Commission on Radiation Units and Measurements	20,975	14,391	6,584
International Society of Radiology	25,577	25,577	—
Sales of NCRP Publications	222,339	—	222,339
Gain on Equipment Lease	3,683	3,683	—

	Total	Operations	Publications Section
Interest Income	2,022	2,022	—
Total revenues	1,453,530	1,224,607	228,923
Expenses			
Direct contract and grant costs	557,301	557,301	—
Personnel [direct compensation and fringe benefits less \$303,802 charged to contracts and grants]	504,551	446,725	57,826
Payroll taxes	46,393	42,747	3,646
Travel (administrative)	50,570	50,570	—
Legal services	1,162	1,162	—
Rent	131,336	111,612	19,724
Office supplies and expenses	31,415	29,949	1,466
Duplicating	9,071	8,886	185
Telephone	10,673	9,999	674
Dues and memberships	1,343	1,343	—
Accounting services	55,200	44,000	11,200
Insurance	19,090	19,090	—
Postage	24,932	21,182	3,750
Printing (administrative)	13,837	13,837	—
Meeting expenses	4,953	4,953	—
Auditing	20,771	20,771	—
Courier service	14,874	4,014	10,860
Miscellaneous	4,812	4,812	—
Depreciation	16,012	15,627	385
Storage	42,093	14,668	27,425
Exhibit	5,751	—	5,751
Binding reports	3,607	—	3,607
Cost of publications sold	39,707	—	39,707
Loss on destroyed publications	256,807	—	256,807
Interest expenses	19,211	19,211	—

Annual Report

	Total	Operations	Publications Section
Total expense	1,885,472	1,442,459	443,013
(Decrease) in net assets	(431,942)	(217,852)	(214,090)

Exhibit C
Statement of Activities
Contingency Fund

(unaudited, December 31, 2002)

Revenue	
Dividends	10,232
Interest	19,228
Total revenue	<u>29,460</u>
Expenses and Losses	
Net unrealized and realized loss on investments	137,974
Investment fees	16,159
Total expenses and losses	<u>154,133</u>
[Decrease] in net assets	<u><u>[124,673]</u></u>

Annual Report

Exhibit D Statement of Activities Capital Campaign Fund *(unaudited, December 31, 2002)*

Revenue	
Interest/Dividends	1,647
Total revenue	<u>1,647</u>
Expenses and Losses	
Net unrealized loss on investments	30,549
Investment fees	3,197
Total expenses and losses	<u>33,746</u>
[Decrease] in net assets	<u>(32,099)</u>

ICRP

Exhibit E
Statement of Changes in Net Assets
(unaudited, December 31, 2002)

	Unrestricted		Temporarily Restricted	Total
	Operating Fund	Contingency Fund	Capital Campaign Fund	
Net assets at beginning of year	173,301	1,028,164	138,472	1,339,937
Interfund transfer	55,000	(55,000)		
(Decrease) Increase in net assets	(431,942)	(124,673)	(32,099)	(588,714)
Net assets (deficit) at end of year	(203,641)	848,491	106,373	751,223

Annual Report

Exhibit F Statement of Cash Flow (unaudited, December 31, 2002)

Change in net assets	(588,714)
Adjustments to Reconcile Excess of Revenue over Expenses to Net Cash Provided by Operating Activities	
Depreciation and amortization	16,012
Realized and unrealized loss on investments	168,523
Gain on capital lease	(3,683)
Decrease in accounts receivable	26,512
Decrease in inventory	258,120
Decrease in prepaid expenses	6,234
Increase in deferred rent	64
Increase in accounts payable and accrued expenses	28,453
Increase in accrued post retirement benefits	49,691
Net cash used in operating activities	(38,788)
Cash Flow from Investing Activities	
Acquisition of furniture and equipment	(15,498)
Sale of investments	119,994
Purchase of investments	(133,567)
Net cash provided by investing activities	(29,071)
Cash flow from financing activities	
Net line of credit payments	(58,466)
Principal payments under capital lease obligations	(4,486)
Net cash provided by financing activities	(62,952)
Net increase (decrease) in cash	(130,811)

Annual Report

NCRP

Cash, beginning of year

134,968

Cash, end of year

4,157

Supplemental Cash Flow Information

Interest paid

19,211

Annual Report

Appendix 2: Publications

Distribution of NCRP Publications

(during the period May 16, 1931 through December 31, 2002)

No.	Title and Year of Publication	Number of Copies Distributed			Both Sources Combined
		Government Printing Office ^a	NCRP Publication ^b		
			2002	Total ^c	
NCRP Reports					
142	Operational Radiation Safety Program for Astronauts in Low-Earth Orbit: A Basic Framework (2002)	—d	0	0	0
141	Managing Potentially Radioactive Scrap Metal (2002)	—d	0	0	0
140	Exposure Criteria for Medical Diagnostic Ultrasound: II. Criteria Based on All Known Mechanisms (2002)	—d	0	0	0
139	Risk-Based Classification of Radioactive and Hazardous Chemical Wastes (2002)	—d	0	0	0
138	Management of Terrorist Events Involving Radioactive Material (2001)	—d	2,392	3,799	3,799
137	Fluence-Based and Microdosimetric Event-Based Methods for Radiation Protection in Space (2001)	—d	177	632	632
136	Evaluation of the Linear-Nonthreshold Dose-Response Model for Ionizing Radiation (2001)	—d	304	971	971
135	Liver Cancer Risk from Internally-Deposited Radionuclides (2001)	—d	90	992	992
134	Operational Radiation Safety Training (2000)	—d	141	917	917
133	Radiation Protection for Procedures Performed Outside the Radiology Department (2000)	—d	114	1,227	1,227
132	Radiation Protection Guidance for Activities in Low-Earth Orbit (2000)	—d	92	780	780
131	Scientific Basis for Evaluating the Risks to Populations from Space Applications of Plutonium (2001)	—d	72	709	709
130	Biological Effects and Exposure Limits for "Hot Particles" (1999)	—d	54	916	916

Annual Report

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
129	Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies (1999)	__d	76	1,496	1,496
128	Radionuclide Exposure of the Embryo/Fetus (1998)	__d	77	1,248	1,248
127	Operational Radiation Safety Program (1998)	__d	96	1,684	1,684
126	Uncertainties in Fatal Cancer Risk Estimates Used in Radiation Protection (1997)	__d	50	1,686	1,686
125	Deposition, Retention and Dosimetry of Inhaled Radioactive Substances (1997)	__d	43	2,377	2,377
124	Sources and Magnitude of Occupational and Public Exposures from Nuclear Medicine Procedures (1996)	__d	45	2,870	2,870
123	Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Ground (1996)	__d	42	2,854	2,854
122	Use of Personal Monitors to Estimate Effective Dose Equivalent and Effective Dose to Workers for External Exposure to Low-LET Radiation (1995)	__d	43	2,962	2,962
121	Principles and Application of Collective Dose in Radiation Protection (1995)	__d	36	2,311	2,311
120	Dose Control at Nuclear Power Plants (1994)	__d	13	2,916	2,916
119	A Practical Guide to the Determination of Human Exposure to Radiofrequency Fields (1993)	__d	49	3,207	3,207
118	Radiation Protection in the Mineral Extraction Industry (1993)	__d	14	2,561	2,561
117	Research Needs for Radiation Protection (1993)	__d	18	1,870	1,870
116	Limitation of Exposure to Ionizing Radiation (1993)	__d	108	6,285	6,285
115	Risk Estimates for Radiation Protection (1993)	__d	56	2,780	2,780
114	Maintaining Radiation Protection Records (1992)	__d	24	2,327	2,327
113	Exposure Criteria for Medical Diagnostic Ultrasound: I. Criteria Based on Thermal Mechanisms (1992)	__d	23	3,188	3,188
112	Calibration of Survey Instruments Used in Radiation Protection for the Assessment of Ionizing Radiation Fields and Radioactive Surface Contamination (1991)	__d	35	3,549	3,549
111	Developing Radiation Emergency Plans for Academic, Medical and Industrial Facilities (1991)	__d	36	3,913	3,913
110	Some Aspects of Strontium Radiobiology (1991)	__d	14	2,485	2,485



No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
109	Effects of Ionizing Radiation on Aquatic Organisms (1991)	__d	23	2,123	2,123
108	Conceptual Basis for Calculations of Absorbed-Dose Distributions (1991)	__d	17	3,028	3,028
107	Implementation of the Principle of As Low As Reasonably Achievable (ALARA) for Medical and Dental Personnel (1990)	__d	29	3,178	3,178
106	Limit for Exposure to "Hot Particles" on the Skin (1990)	__d	12	2,792	2,792
105	Radiation Protection for Medical and Allied Health Personnel (1989)	__d	92	6,261	6,261
104	The Relative Biological Effectiveness of Radiations of Different Quality (1990)	__d	20	2,322	2,322
103	Control of Radon in Houses (1989)	__d	12	3,699	3,699
102	Medical X-Ray, Electron Beam and Gamma-Ray Protection for Energies up to 50 MeV (Equipment Design, Performance and Use) (1989)	__d	114	7,017	7,017
101	Exposure of the U.S. Population from Occupational Radiation (1989)	__d	16	4,085	4,085
100	Exposure of the U.S. Population from Diagnostic Medical Radiation (1989)	__d	25	4,859	4,859
99	Quality Assurance for Diagnostic Imaging (1988)	__d	86	7,155	7,155
98	Guidance on Radiation Received in Space Activities (1989)	__d	8	3,337	3,337
97	Measurement of Radon and Radon Daughters in Air (1988)	__d	21	4,133	4,133
96	Comparative Carcinogenicity of Ionizing Radiation and Chemicals (1989)	__d	11	4,044	4,044
95	Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources (1987)	__d	36	4,128	4,128
94	Exposure of the Population in the United States and Canada from Natural Background Radiation (1987)	__d	44	4,216	4,216
93	Ionizing Radiation Exposure of the Population of the United States (1987)	__d	26	7,216	7,216
92	Public Radiation Exposure from Nuclear Power Generation in the United States (1987)	__d	13	3,636	3,636
91	Recommendations on Limits for Exposure to Ionizing Radiation (1987)	__d	__e	8,483	8,483
90	Neptunium: Radiation Protection Guidelines (1988)	__d	8	2,883	2,883

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
89	Genetic Effects from Internally Deposited Radionuclides (1987)	—d	9	3,679	3,679
88	Radiation Alarms and Access Control Systems (1986)	—d	17	4,703	4,703
87	Use of Bioassay Procedures for Assessment of Internal Radionuclide Deposition (1987)	—d	9	4,129	4,129
86	Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields (1986)	—d	17	5,174	5,174
85	Mammography—A User's Guide (1986)	—d	14	32,630	32,630
84	General Concepts for the Dosimetry of Internally Deposited Radionuclides (1985)	—d	13	4,184	4,184
83	The Experimental Basis for Absorbed-Dose Calculations in Medical Uses of Radionuclides (1985)	—d	13	3,509	3,509
82	SI Units in Radiation Protection and Measurements (1985)	—d	21	4,485	4,485
81	Carbon-14 in the Environment (1985)	—d	10	3,935	3,935
80	Induction of Thyroid Cancer by Ionizing Radiation (1985)	—d	8	4,236	4,236
79	Neutron Contamination from Medical Electron Accelerators (1984)	—d	49	4,584	4,584
78	Evaluation of Occupational and Environmental Exposures to Radon and Radon Daughters in the United States (1984)	—d	63	6,431	6,431
77	Exposures from the Uranium Series with Emphasis on Radon and Its Daughters (1984)	—d	9	6,615	6,615
76	Radiological Assessment: Predicting the Transport, Bioaccumulation, and Uptake by Man of Radionuclides Released to the Environment (1984)	—d	10	6,638	6,638
75	Iodine-129: Evaluation of Release from Nuclear Power Generation (1983)	—d	5	5,915	5,915
74	Biological Effects of Ultrasound: Mechanisms and Clinical Implications (1983)	—d	15	11,163	11,163
73	Protection in Nuclear Medicine and Ultrasound Diagnostic Procedures in Children (1983)	—d	10	5,454	5,454
72	Radiation Protection and Measurement for Low-Voltage Neutron Generators (1983)	—d	13	4,361	4,361
71	Operational Radiation Safety—Training (1983)	—d	4	5,065	5,065
70	Nuclear Medicine—Factors Influencing the Choice and Use of Radionuclides in Diagnosis and Therapy (1982)	—d	11	5,362	5,362

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
69	Dosimetry of X-Ray and Gamma-Ray Beams for Radiation Therapy in the Energy Range 10 keV to 50 MeV (1981)	__d	53	4,937	4,937
68	Radiation Protection in Pediatric Radiology (1981)	__d	10	4,415	4,415
67	Radiofrequency Electromagnetic Fields— Properties, Quantities and Units, Biophysical Interaction and Measurements (1981)	__d	10	5,381	5,381
66	Mammography (1980)	__d	__e	4,598	4,598
65	Management of Persons Accidentally Contaminated with Radionuclides (1980)	__d	518	16,819	16,819
64	Influence of Dose and Its Distribution in Time on Dose-Response Relationships for Low-LET Radiations (1980)	__d	6	5,211	5,211
63	Tritium and Other Radionuclide Labeled Organic Compounds Incorporated in Genetic Material (1979)	__d	4	4,301	4,301
62	Tritium in the Environment (1979)	__d	8	3,852	3,852
61	Radiation Safety Training Criteria for Industrial Radiography (1978)	__d	9	6,117	6,117
60	Physical, Chemical and Biological Properties of Radiocesium Relevant to Radiation Protection Guidelines (1979)	__d	3	3,970	3,970
59	Operational Radiation Safety Program (1979)	__d	3	8,045	8,045
58	A Handbook of Radioactivity Measurements Procedures (1978)	__d	17	13,443	13,443
57	Instrumentation and Monitoring Methods for Radiation Protection (1978)	__d	14	10,860	10,860
56	Radiation Exposure from Consumer Products and Miscellaneous Sources (1977)	__d	__e	5,905	5,905
55	Protection of the Thyroid Gland in the Event of Releases of Radioiodine (1977)	__d	8	6,796	6,796
54	Medical Radiation Exposure of Pregnant and Potentially Pregnant Women (1977)	__d	31	10,341	10,341
53	Review of NCRP Radiation Dose Limit for Embryo and Fetus in Occupationally Exposed Women (1977)	__d	__e	9,289	9,289
52	Cesium-137 from the Environment to Man: Metabolism and Dose (1977)	__d	5	4,663	4,663
51	Radiation Protection Design Guidelines for 0.1-100 MeV Particle Accelerator Facilities (1977)	__d	45	8,509	8,509
50	Environmental Radiation Measurements (1976)	__d	7	7,860	7,860

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
49	Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies up to 10 MeV (1976)	__d	131	16,932	16,932
	Adjunct to NCRP Report 49 (1976)	__d	16	2,768	2,768
48	Radiation Protection for Medical and Allied Health Personnel (1976)	__d	__e	14,359	14,359
47	Tritium Measurement Techniques (1975)	__d	8	6,321	6,321
46	Alpha-Emitting Particles in Lungs (1975)	__d	6	6,045	6,045
45	Natural Background Radiation in the United States (1975)	__d	__e	7,296	7,296
44	Krypton-85 in the Atmosphere— Accumulation, Biological Significance, and Control Technology (1975)	__d	4	6,318	6,318
43	Review of the Current State of Radiation Protection Philosophy (1975)	__d	__e	9,722	9,722
42	Radiological Factors Affecting Decision-Making in a Nuclear Attack (1974)	__d	16	47,157	47,157
41	Specification of Gamma-Ray Brachytherapy Sources (1974)	__c	5	5,434	5,434
40	Protection Against Radiation from Brachytherapy Sources (1972)	__d	10	9,704	9,704
39	Basic Radiation Protection Criteria (1971)	__d	__e	40,393	40,393
38	Protection Against Neutron Radiation (1971)	__d	82	8,798	8,798
37	Precautions in the Management of Patients who have Received Therapeutic Amounts of Radionuclides (1970)	__d	18	17,297	17,297
36	Radiation Protection in Veterinary Medicine (1970)	__d	5	7,606	7,606
35	Dental X-Ray Protection (1970)	__d	16	28,535	28,535
34	Medical X-Ray and Gamma-Ray Protection for Energies up to 10 MeV— Structural Shielding Design and Evaluation (1970)	__d	__e	17,622	17,622
33	Medical X-Ray and Gamma-Ray Protection for Energies up to 10 MeV— Equipment Design and Use (1968)	__d	__e	98,134	98,134
32	Radiation Protection in Educational Institutions (1966)	__d	6	22,333	22,333
31	Shielding for High Energy Electron Accelerator Installations (1964)	3,700	__e	2,697	6,397
30	Safe Handling of Radioactive Materials (1964)	24,450	9	9,870	34,320

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
29	Exposure to Radiation in an Emergency	55,705	—e	3,678	59,383
28	A Manual of Radioactivity Procedures (1961)	22,892	—e	3,665	26,557
27	Stopping Powers for Use with Cavity Chambers (1961)	4,144	6	3,809	7,953
26	Medical X-Ray Protection up to Three Million Volts (1961)	75,894	—e	27,154	103,048
25	Measurement of Absorbed Dose of Neutrons and Mixtures of Neutrons and Gamma Rays (1961)	10,790	7	4,080	14,870
24	Protection Against Radiations from Sealed Gamma Sources (1960)	35,710	—e	953	36,663
23	Measurement of Neutron Flux and Spectra for Physical and Biological Applications (1960)	11,849	0	3,071	14,920
22	Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure (1959)	52,526	5	7,386	59,912
21	Safe Handling of Bodies Containing Radioactive Isotopes (1958)	29,304	—e	2,352	31,656
20	Protection Against Neutron Radiation up to 30 Million Electron Volts (1957)	16,989	—e	353	17,342
19	Regulation of Radiation Exposure by Legislative Means (1955)	15,140	—e	—h	15,140
18	X-Ray Protection (1955)	98,713	—e	—h	98,713
17	Permissible Dose from External Sources of Ionizing Radiation (1954)	60,530	—e	2,038	62,568
16	Radioactive Waste Disposal in the Ocean (1954)	16,203	—e	2,664	18,867
15	Safe Handling of Cadavers Containing Radioactive Isotopes (1953)	14,486	—e	—h	14,486
14	Protection Against Betatron-Synchrotron Radiations up to 100 Million Electron Volts (1954)	27,190	—e	1,710	28,900
13	Protection Against Radiation from Radium, Cobalt-60 and Cesium-137 (1954)	22,785	—e	—h	22,785
12	Recommendations for the Disposal of Carbon-14 Wastes (1953)	23,506	—e	2,571	26,077
11	Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water (1953)	32,494	—e	—h	32,494
10	Radiological Monitoring Methods and Instruments (1952)	59,651	—e	3,894	63,545

Annual Report

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
9	Recommendations for Waste Disposal of Phosphorus-32 and Iodine-131 for Medical Users [1951]	28,810	__e	5,682	34,492
8	Control and Removal of Radioactive Contamination in Laboratories [1951]	50,500	9	7,510	58,010
7	Safe Handling of Radioactive Isotopes [1949]	60,867	__e	__h	60,867
6	Medical X-Ray Protection up to Two Million Volts [1949]	70,261	__e	__h	70,261
5	Safe Handling of Radioactive Luminous Compounds [1941]	6,187	__e	__h	6,187
4	Radium Protection [1938]	10,086	__e	__h	10,086
3	X-Ray Protection [1936]	16,490	__e	__h	16,490
2	Radium Protection [1934]	__g	__e	__h	0
1	X-Ray Protection [1931]	1,596	__e	__h	1,596
Total NCRP Reports Distributed		959,448	6,377	899,582	1,859,030

Lauriston S. Taylor Lectures

25	Assuring the Safety of Medical Diagnostic Ultrasound, Wesley L. Nyborg (2001). Health Phys. 82 , 578-587	__i	__i	__i	__i
24	Administered Radioactivity: <i>Unde Venimus Quoque Imus</i> , S. James Adelstein (2000). Health Phys. 80 , 317-324	__i	__i	__i	__i
23	Back to Background: Natural Radiation and Radioactivity Exposed, by Naomi H. Harley [1999]. Health Phys. 79 , 121-128	__i	__i	__i	__i
22	From Chimney Sweeps to Astronauts: Cancer Risks in the Work Place, by Eric J. Hall [1998]. Health Phys. 75 , 357-366	__i	__i	__i	__i
21	Radionuclides in the Body: Meeting the Challenge, by William J. Bair [1997]. Health Phys. 73 , 423-432	__i	__i	__i	__i
20	70 Years of Radiation Genetics: Fruit Flies, Mice and Humans, by Seymour Abrahamson [1996]. Health Phys. 71 , 624-633	__i	__i	__i	__i
19	Certainty and Uncertainty in Radiation Research, by Albrecht M. Kellerer [1995]. Health Phys. 69 , 446-453	__i	__i	__i	__i
18	Mice, Myths and Men, by R.J. Michael Fry [1995]	__d	2	506	506
17	Science, Radiation Protection and the NCRP, by Warren K. Sinclair [1993]	__d	2	539	539

NCRP

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
16	Dose and Risk in Diagnostic Radiology: How Big? How Little?, by Edward W. Webster (1992)	—d	1	1,417	1,417
15	When is a Dose Not a Dose?, by Victor P. Bond (1992)	—d	0	747	747
14	Radiation Protection and the Internal Emitter Saga, by J. Newell Stannard (1990)	—d	0	349	349
13	Radiobiology and Radiation Protection: The Past Century and Prospects for the Future, by Arthur C. Upton (1989)	—d	1	577	577
12	How Safe is Safe Enough?, by Bo Lindell (1988)	—d	1	1,003	1,003
11	How to Be Quantitative about Radiation Risk Estimates, by Seymour Jablon (1988)	—d	2	1,014	1,014
10	Biological Effects of Non-Ionizing Radiations: Cellular Properties and Interactions, by Herman P. Schwan (1987)	—d	0	1,687	1,687
9	Truth (and Beauty) in Radiation Measurement, by John H. Harley (1985)	—d	1	761	761
8	Limitation and Assessment in Radiation Protection, by Harald H. Rossi (1984)	—d	0	1,525	1,525
7	The Human Environment— Past, Present and Future, by Merril Eisenbud (1983)	—d	0	1,034	1,034
6	Ethics, Trade-Offs and Medical Radiation, by Eugene L. Saenger (1982)	—d	0	1,245	1,245
5	How Well Can We Assess Genetic Risk? Not Very, by James F. Crow (1981)	—d	1	1,403	1,403
4	From "Quantity of Radiation" and "Dose" to "Exposure" and "Absorbed Dose"— An Historical Review, by Harold O. Wyckoff (1980)	—d	1	1,845	1,845
3	Radiation Protection— Concepts and Trade Offs, by Hymer L. Friedell (1979)	—d	0	2,081	2,081
2	Why be Quantitative about Radiation Risk Estimates? by Sir Edward E. Pochin	—d	0	2,338	2,338
1	The Squares of the Natural Numbers in Radiation Protection, by Herbert M. Parker (1977)	—d	3	1,809	1,809
Total Lectures Distributed			15	21,880	21,880

Annual Report

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
NCRP Annual Meeting Proceedings					
23	Fallout from Atmospheric Nuclear Tests— Impact on Science and Society, Proceedings of the Thirty-seventh Annual Meeting held April 4-5, 2001, Health Phys. 82, 573-748 [2002]	—i	—i	—i	—i
22	Ionizing Radiation Science and Protection in the 21st Century, Proceedings of the Thirty-sixth Annual Meeting held April 5-6, 2000, Health Phys. 80, 317-402 [2001]	—i	—i	—i	—i
21	Radiation Protection in Medicine: Contemporary Issues, Proceedings of the Thirty-fifth Annual Meeting held April 7-8, 1999 [1999]	—d	6	192	192
	Compact Disk version	—d	3	70	70
20	Cosmic Radiation Exposure of Airline Crews, Passengers and Astronauts, Proceedings of the Thirty-fourth Annual Meeting held on April 1-2, 1998, Health Phys. 79, 466-613 [2000]	—i	—i	—i	—i
19	The Effects of Pre- and Postconception Exposure to Radiation, Proceedings of the Thirty-third Annual Meeting held on April 2-3, 1997, Teratology 59, 181-317 [1999]	—i	—i	—i	—i
18	Implications of New Data on Radiation Cancer Risk, Proceedings of the Thirty-second Annual Meeting held April 3-4, 1996 [1997]	—d	1	366	366
17	Environmental Dose Reconstruction and Risk Implications, Proceedings of the Thirty-first Annual Meeting held April 12-13, 1995 [1996]	—d	1	413	413
16	Extremely-Low-Frequency Electromagnetic Fields: Issues in Biological Effects and Public Health, Proceedings of the Thirtieth Annual Meeting held on April 5-7, 1994 [not published]	—d			
15	Radiation Science and Societal Decision Making, Proceedings of the Twenty-Ninth Annual Meeting held April 7-8, 1993 [1994]	—d	0	563	563
14	Radiation Protection in Medicine, Proceedings of the Twenty-Eighth Annual Meeting held April 1-2, 1992 [1993]	—d	0	841	841
13	Genes, Cancer and Radiation Protection, Proceedings of the Twenty-Seventh Annual Meeting held April 3-4, 1991 [1992]	—d	1	687	687
12	Health and Ecological Implications of Radioactively Contaminated Environments, Proceedings of the Twenty-Sixth Annual Meeting held April 4-5, 1990 [1991]	—d	0	912	912

No.	Title and Year of Publication	Number of Copies Distributed		
		Government Printing Office ^a	NCRP Publication ^b	
			2002	Total ^c
11	Radiation Protection Today— The NCRP at Sixty Years, Proceedings of the Twenty-Fifth Annual Meeting held April 4-5, 1990 [1990]	—d	0	651
10	Radon, Proceedings of the Twenty-Fourth Annual Meeting held March 30-31, 1988 [1989]	—d	0	1,451
9	New Dosimetry at Hiroshima and Nagasaki and Its Implications for Risk Estimates, Proceedings of the Twenty-Third Annual Meeting held April 8-9, 1987 [1989]	—d	2	747
8	Nonionizing Electromagnetic Radiations and Ultrasound, Proceedings of the Twenty-Second Annual Meeting held April 2-3, 1986 [1988]	—d	0	1,019
7	Radioactive Waste, Proceedings of the Twenty-First Annual Meeting held April 3-4, 1985 [1986]	—d	0	1,415
6	Some Issues Important in Developing Basic Radiation Protection Recommendations, Proceedings of the Twentieth Annual Meeting held April 4-5, 1984 [1985]	—d	0	1,537
5	Environmental Radioactivity, Proceedings of the Nineteenth Annual Meeting held April 6-7, 1983 [1984]	—d	0	3,975
4	Radiation Protection and New Medical Diagnostic Approaches, Proceedings of the Eighteenth Annual Meeting held April 6-7, 1982 [1983]	—d	0	1,206
3	Critical Issues in Setting Radiation Dose Limits, Proceedings of the Seventeenth Annual Meeting held April 8-9, 1981 [1982]	—d	1	1,660
2	Quantitative Risk in Standards Setting, Proceedings of the Sixteenth Annual Meeting held April 2-3, 1980 [1981]	—d	—e	2,158
1	Perceptions of Risk, Proceedings of the Fifteenth Annual Meeting held March 14-15, 1979 [1980]	—d	9	1,940
Total Proceedings Distributed			24	21,803
NCRP Commentaries				
15	Evaluating the Reliability of Biokinetic and Dosimetric Models and Parameters Used to Assess Individual Doses for Risk Assessment Purposes [1998]	—d	11	580
14	A Guide for Uncertainty Analysis in Dose and Risk Assessments Related to Environmental Contamination [1996]	—d	11	1,573

No.	Title and Year of Publication	Number of Copies Distributed			
		Government Printing Office ^a	NCRP Publication ^b		Both Sources Combined
			2002	Total ^c	
13	An Introduction to Efficacy in Diagnostic Radiology and Nuclear Medicine (Justification of Medical Radiation Exposure) [1995]	__d	4	1,310	1,310
12	Radiation Exposure and High-Altitude Flight [1995]	__d	7	514	514
11	Dose Limits for Individuals Who Receive Exposure from Radionuclide Therapy Patients [1995]	__d	7	1,236	1,236
10	Advising the Public about Radiation Emergencies: A Document for Public Comment [1994]	__d	8	1,127	1,127
9	Considerations Regarding the Unintended Radiation Exposure of the Embryo, Fetus or Nursing Child [1994]	__d	8	1,299	1,299
8	Uncertainty in NCRP Screening Models Relating to Atmospheric Transport, Deposition and Uptake by Humans [1993]	__d	1	826	826
7	Misadministration of Radioactive Material in Medicine—Scientific Background [1991]	__d	9	1,062	1,062
6	Radon Exposure of the U.S. Population—Status of the Problem [1991]	__d	4	1,091	1,091
5	Review of the Publication, "Living Without Landfills" [1989]	__d	1	3,085	3,085
4	Guidelines for the Release of Waste Water from Nuclear Facilities with Special Reference to the Public Health Significance of the Proposed Release of Treated Waste Waters at Three Mile Island [1987]	__d	2	847	847
3	Screening Techniques for Determining Compliance with Environmental Standards—Releases of Radionuclides to the Atmosphere [1986]	__d	__e	3,602	3,602
2	Preliminary Evaluation of Criteria for the Disposal of Transuranic Contaminated Waste [1982]	__d	__e	292	292
1	Krypton-85 in the Atmosphere— with Specific Reference to the Public Health Significance of the Proposed Controlled Release at Three Mile Island [1980]	__d	2	402	402
Total Commentaries Distributed			75	18,846	18,846

NCRP Symposia Proceedings

3	Acceptability of Risk from Radiation— Application to Human Space Flight, Proceedings of a Symposium held May 29, 1996 (1997)	__d	2	593	593
---	------------------------------------------------------------------------------------------------------------------------------	-----	---	-----	-----

No.	Title and Year of Publication	Number of Copies Distributed		
		Government Printing Office ^a	NCRP Publication ^b	
			2002	Total ^c
2	Radioactive and Mixed Waste—Risk as a Basis for Waste Classification, Proceedings of a Symposium held November 9, 1994 (1995)	^d	1	456
1	The Control of Exposure of the Public to Ionizing Radiation in the Event of Accident or Attack, Proceedings of a Symposium held April 27-28, 1981 (1982)	^d	3	1,817
Total Symposia Proceedings Distributed			6	2,866
Total NCRP Publications Distributed		959,448	6,497	964,977
				1,924,425

^aThe U.S. Government Printing Office distributed NCRP reports during the period May 16, 1931 through December 31, 1975.

^bIncludes distribution of complimentary copies.

^cSince the initiation of the NCRP Publication Program in July 1966.

^dDocument distributed only by NCRP Publications.

^eOut of print before December 31, 2002.

^fThis report was not distributed by the U.S. Government Printing Office. The report was originally published by the Section of Nuclear Medicine, Department of Pharmacology, The University of Chicago, Chicago, Illinois and the distribution given here was by that office.

^gNo record of distribution is available.

^hOut of print prior to initiation of Publication Program in July 1966.

ⁱPublished and distributed by source indicated.