

Annual Report

2015

Year in Review





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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.

Participants in the Council's work are the Council members and members of scientific, advisory and administrative committees. Council members are selected 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 committees' interests, draft reports, commentaries and statements. These are then submitted to the full membership of the Council for careful review and approval before being published.

Mission

To support radiation protection by providing independent scientific analysis, information and recommendations that represent the consensus of leading scientists.



Lauriston S. Taylor
1929 – 1977



Warren K. Sinclair
1977 – 1991



Charles B. Meinhold
1991 – 2002



Thomas S. Tenforde
2002 – 2012



John D. Boice, Jr.
2012 –



President's Message

The National Council on Radiation Protection and Measurements (NCRP) strives to address national needs in radiation protection. It has been another exciting year with the resurgence of committees overflowing with new scientific ideas. A few highlights:

- Council Committee 1 (CC 1), Radiation Protection Guidance for the United States, got off to a rapid start in providing a new look at radiation protection guidance for the United States. NCRP Report No. 116 (1993) is being updated with financial support from the U.S. Nuclear Regulatory Commission (NRC) (Co-Chairs: John D. Boice, Jr. and Kenneth R. Kase).
- Council Committee 2 (CC 2), Meeting the Needs of the Nation for Radiation Protection, continues and expands upon our Where are the Radiation Professionals? (WARP) initiative. This is arguably the most important activity NCRP has embarked upon. Statement No. 12 was published (Chair: Richard E. Toohey; Co-Chairs: John D. Boice, Jr. and Kathryn H. Pryor).
- Commentary No. 24, *Health Effects of Low Doses of Radiation: Perspectives on Integrating Radiation Biology and Epidemiology* (2015) was published (Co-Chairs: Sally Amundson and Jonine Bernstein).
- Commentary No. 25, *Potential for Central Nervous System Effects from Radiation Exposure During Space Activities Phase I: Overview* (2016) was published (Co-Chairs: Leslie A. Braby and Richard S. Nowakowski).
- The president wrote 12 columns on “all things radiation” for the *Health Physics News*, made 16 presentations to national, international, scientific and university audiences, and had nine publications in the scientific literature.
- Funds to support NCRP scientific committees (SC) have been provided by several agencies including the NRC (CC 1, SC 1-23, SC 1-25), the National Aeronautics and Space Administration (NASA) (SC 1-24), the U.S. Department of Homeland Security (DHS) (SC 3-1), the U.S. Department of Energy (DOE) (SC 1-22, SC 6-9), the Food and Drug Administration (SC 4-5), and the Centers for Disease Control and Protection (SC 1-20, SC 2-6, SC 4-5, SC 4-7, SC 6-9).
- The Million Person Study of Low Dose Radiation Health Effects is recognized around the world as the major investigation to fill gaps in understanding the health effects of exposures received gradually over time. Support has been received from many agencies [U.S. Department of Defense (DOD), DOE, U.S. Environmental Protection Agency (EPA), NASA, the National Cancer Institute (NCI), NRC] but has been substantially reduced and eliminated in some cases. Thus there is a serious need to secure adequate funding for completion before this window of opportunity closes.
- A joint Radiation Research Society (RRS)/NCRP symposium was held at the 2015 RRS Annual Meeting in Ft. Lauderdale featuring SC 1-23 work.

- A workshop was held at the 2016 mid-year meeting of the Health Physics Society (HPS) in Austin, Texas on “Radiation Protection for Naturally Occurring Radioactive Materials (NORM) and Technologically Enhanced NORM (TENORM) from Oil and Gas Recovery.”
- A refresher course was conducted at the 2015 Annual Meeting of the Radiological Society of North America on “Biodosimetry Issues Following a Major Radiological Incident.”
- SC 1-23 is providing a fresh look on the radiation protection issues for lens of the eye (Co-Chairs: Eleanor A. Blakeley and Lawrence T. Dauer). A draft Commentary has been prepared.
- SC 1-24 has continued to look at radiation exposures in space and the potential for effects on the central nervous system. A new committee for Phase 2 was created and initial meetings held in Galveston (Co-Chairs: Leslie A. Braby and Jacob Raber). Lawrence W. Townsend is the new staff consultant.
- SC 3-1 has been progressing at full speed in cooperation with the New York City Department of Health and Mental Hygiene and other state and federal agencies to address the complex issues of dosimetry for emergency responders in the event of an improvised nuclear device being detonated (Co-Chairs: Stephen V. Musolino and Adela Salame-Alfie). James Smith is the new staff consultant.
- SC 6-9 continues to provide comprehensive assessment of the complex radiation dosimetry issues for the Million Worker and Veterans Study (Chair: Andre Bouville; Co-Chair: Richard E. Toohey). A comprehensive overview was published in the *Health Physics* journal (2015). A comprehensive report is being prepared for Council review.
- SC 1-20 has recently completed a draft report on Bioeffectiveness of Low Energy Radiation (Chair: Steve L. Simon) that is ready for Council review.
- SC 2-6 has recently completed a draft report on radiation protection issues in nanotechnology that is currently out for Council review (Chair: Mark D. Hoover; Co-Chair: David S. Myers).
- SC 2-7 has recently completed a draft commentary on radiation protection issues and sealed radiation sources (Chair: Kathryn H. Pryor).
- SC 4-5 has recently completed a draft Report on protection in dentistry associated with cone beam computed tomography (CT) (Co-Chairs: Mel L. Kantor and Alan G. Lurie).
- SC 4-7 continues its work on communicating radiation risks and institution review board guidance (Chair: Julie E.K. Timins)
- SC 4-8 continues its work on patient dose and CT (Chair: Munnudeep K.S. Kalra).
- SC 5-2 was approved to address Radiation Protection for Naturally Occurring Radioactive Materials (NORM) and Technologically Enhanced NORM (TENORM) from Oil and Gas Recovery (Chair: William E. Kennedy, Jr.).
- SC 1-25 on Recent Epidemiologic Studies and Implications for the Linear Nonthreshold Model was formed (Chair: Roy E. Shore; Co-Chair: Lawrence T. Dauer) and plans to provide guidance to CC 1 by the first quarter of 2017.
- A Biodosimetry Workshop at the Radiological Society of North America annual meeting in 2015 was sponsored by NCRP and a second will be held in 2016.

The President has met and discussed opportunities for partnership with personnel at the American College of Radiology (ACR), Harvard University, HPS, NASA, U.S. Naval Reactors, NRC, RRS, and others. NCRP strives to be relevant and attuned to the needs of the nation across many disciplines.

Yet, despite the obvious need for radiation guidance in the United States, we are being overwhelmed by two tidal waves of societal change: there continues to be a dwindling number of radiation professionals available to meet the needs of the nation, and the sources of funding for radiation protection activities continue in a downward spiral. Our WARP initiative addresses these tsunami trends of reality, but solutions must include increased governmental recognition and support.

NCRP continues to encourage the passing of H.R. 35, the Bill on Low-Dose Radiation Research which seeks to develop a strategy for health research on low-dose radiation to meet national needs. If passed by the Senate and signed by the President, the Bill would require that:

- scientific challenges to understanding low-dose effects be identified;
- current status of research be assessed;
- scientific goals for future research be formulated;
- long-term strategy be recommended; and
- research agenda be prioritized to overcome the challenges and meet the goals.

I applaud our legislative leaders for recognizing a serious gap in the nation's infrastructure necessary to deal with the burgeoning exposure of the population to medical radiation, the potential burden of regulatory actions if overly conservative, as well as the consequences of nuclear terrorism and major nuclear reactor accidents.

SC 1-21 was remarkably prescient and has published a commentary on the health effects of low doses of radiation: integrating radiation biology and epidemiology. These goals are similar to those articulated in H.R. 35. Critical research needs for evaluating low-dose radiation health effects are the focus to bridging the gap between molecules and the entire human being. Biologically-based models coupled with high-quality, large-scale epidemiologic data such as those coming from the Million Person Study are one way forward. This public awareness about gaps in radiation knowledge further accentuates the urgency for developing and strengthening major programs in the United States to train, engage and retain radiation protection professionals necessary to meet the needs of our nation.

The issues of radiation protection in the 21st century have been sculptured by recent events, by the increasing use of radiation in medicine, and by the horrific possibility of a nuclear terrorist act. The March 11, 2011 Fukushima nuclear reactor accident and meltdown was a major radiation disaster which brought into vivid focus the need for radiation guidance and improved ways to communicate with the press, members of the public, and equally important the medical community and scientists. The 2007 International Commission on Radiological Protection (ICRP) made recommendations that have generated interest around the world and coincide with U.S. initiatives to update and revise our protection regulations. NCRP is addressing the needs for regulatory change and thoughtful guidance by creating CC 1 which deals directly with updating NCRP Report No.116 entitled *Limitation of Exposure to Ionizing Radiation*. Further, we are about to complete a commentary on the issues involving lens of the eye dose (SC 1-23), a topic which caused and continues to cause some controversy after the ICRP recommendations were made.

The remarkable increase in public exposure to medical radiological imaging (over 85 million CT exams per year!) heightens the need for continued protection guidance in this important medical

advance and the beneficial uses of ionizing radiation. The unsettling nature of world affairs raises the possibility that a terrorist event with nuclear devices may occur on U.S. soil. The 2014 NCRP Annual Meeting entitled, “NCRP: Achievements of the Past 50 Years and Addressing the Needs of the Future” (published in 2015) addressed many of these issues involving the future of radiation protection in the United States.

Our financial situation, in my view, has decreased from a B to a B-: okay (we can keep the lights on) but long-term funding possibilities remain highly uncertain. In addition to grants and contracts, we receive interagency support for research efforts for the Million Person Study, and we are reaching out to government agencies to support the initiatives outlined above as well as professional societies, universities, industry, donors, and benefactors. We are grateful for our corporate sponsors and many professional contributors but we need more resources to increase our ability to serve the nation at this critical time. We will continue to develop innovative approaches for resource gathering and have reestablished our resource committee (Chair: James A. Brink) under the auspices of our finance committee. Please send us your ideas for opportunities to support NCRP, and your interest in helping.

To secure the long-term stability of NCRP, creating a foundation with endowed funding would go a long way to address basic salary needs, support for interns and training, and expansion of the activities related to the ever increasing needs of the nation for radiation protection.

Small endeavors to increase the financial stability of NCRP include the AmazonSmile® initiative where, at no cost to the individual, all purchases made on Amazon will provide a small percentage back to NCRP. Other opportunities suggested were to add NCRP as a small percentage beneficiary on IRAs, 401(k)s, and life insurance policies as already done by a number of Council members. Council members also make direct charitable contributions to NCRP and the donations in memory of William M. Beckner and William F. Morgan this past year were very much appreciated. As an example, I continue to make charitable contributions to NCRP to assist with ongoing programs. The funds can be committed to a specific topic or uncommitted and then applied to defray the costs of the annual meeting and underfunded program areas.

Our 2014 Annual Meeting (published in 2015) showcased NCRP and the past 50 y of accomplishments since being chartered by Congress in 1964 and our plans, goals and dreams for the future. The Annual Meeting enhanced many of the innovations from previous meetings, including written questions and published answers and a “rapid” publication of the proceedings in *Health Physics*.

Our 2015 Annual Meeting (published in 2016) was on “Changing Regulations and Radiation Guidance: What Does the Future Hold?” As NCRP begins its second half century since our Congressional Charter in 1964, our program of activities encompasses the future landscape of radiation protection regulation and guidance in the United States. The wide range of uses for radiation and radioactive materials pose challenges and opportunities that must be addressed in a consistent and coherent way. The United States stands at a junction where decisions are needed in many areas, recommendations and scientific information are being updated, and serious examinations are being made of the basis and rationale for our system of protection. Within NCRP, work is underway in CC 1 to update existing NCRP recommendations, last published in 1993.

Our 2016 Annual Meeting is on “Meeting the Needs of the Nation for Radiation Protection.” As above, this meeting will be a continuation of our WARP initiative (Statement No. 12) and CC 2 activi-

ties. New enhancements include for the first time the Joint Armed Forces Honor Guard from the Military District of Washington D.C. and the singing of our National Anthem by Kimberly Gaskins of NRC. The 2016 Annual Meeting features the 40th Lauriston S. Taylor Lecture by John W. Poston, Jr. who will discuss radiation protection and regulatory science; the 13th Annual Warren F. Sinclair address presented by Dr. Richard E. Toohey, who will review the WARP-related activities of NCRP; and the 2016 Members' Dinner Speaker, Randall N. Hyer, whose talk is entitled "Breaking Bad News in the High-Concern, Low Trust Setting – How to Get your Story Heard."

A column of NCRP and other radiation professional activities ("The Boice Report") has completed its fourth year of monthly publications in *Health Physics News*. Covered are recent events in radiation protection, measurements, science, and health throughout the world. There have now been 43 columns published through December 2015. A compilation publication is being considered once 50 columns have been published. The President's travel schedule and presentation schedule in 2015 continued to be substantial and includes presentations at the Harvard T.H. Chan School of Public Health, the U.S. Submarine Veterans Capitol Base, the Division of Environmental Hazards and Health Effects Director's Science Seminar, the Oak Ridge National Laboratory Environmental Science Division seminar series, the Uniformed Services University of the Health Sciences, the NCI Radiation Epidemiology and Dosimetry Course, the Annual Meeting of the American College of Radiology, the Interagency Steering Committee on Radiation Standards, the American Nuclear Society 60th Annual Meeting President's Special Session, the 60th Annual Meeting of the Health Physics Society, the 61st Annual Meeting of the Radiation Research Society, the Korean Association for Radiation Protection/ICRP Session, the Louisiana State University School of Public Health (John A. Rock Visiting Scholar Lecture), and Colorado State University.

The 2015 calendar year was productive with the initiation of many scientific committees outlined above and the publication of NCRP commentaries, reports, proceedings, statements, and scientific articles. These include:

- NCRP Commentary No. 24, *Health Effects of Low Doses of Radiation: Perspectives on Integrating Radiation Biology and Epidemiology* (2015) was published.
- Publishing a summary of completed NCRP reports and commentaries in the scientific literature is enthusiastically encouraged as a way to reach more audiences. A preview of Commentary No. 24 was written by R. Julian Preston ["Integrating basic radiobiological science and epidemiological studies: Why and how," *Health Phys.* **108**(2), 125–130 (2015)].
- NCRP Commentary No. 25, *Potential for Central Nervous System Effects from Radiation Exposure During Space Activities Phase I: Overview* (2016) was published.
- The Proceedings of the 50th Annual Meeting in 2014 on "NCRP: Achievements of the Past 50 Years and Addressing the Needs of the Future" (Chair: Kenneth R. Kase; Co-Chairs: John D. Boice, Jr. and Jerrold T. Bushberg) was published in February 2015. We continue to strive for a rapid publication to make our scientific deliberations and recommendations more timely and accessible. The Proceedings included the 38th Lauriston S. Taylor Lecture on Radiation Protection and Measurements by Fred A. Mettler, Jr. "On the Shoulders of Giants: Radiation Protection Over 50 Years" and the 11th Annual Warren K. Sinclair Keynote Address by Jerrold T. Bushberg on "Sci-

ence, Radiation Protection, and the NCRP: Building on the Past, Looking to the Future. A wonderful summary by Richard E. Toohey with accompanying photographs by Genevieve S. Roessler were published just a few weeks after the Annual Meeting in the April 2014 issue of *Health Physics News!*

- The Proceedings of the 51st Annual Meeting in 2015 on “Changing Regulations and Radiation Guidance: What Does the Future Hold?” (Chairs: Donald A. Cool, Ruth E. McBurney, and Kathryn H. Pryor) was published in February 2016. The Proceedings included the 39th Lauriston S. Taylor Lecture on Radiation Protection and Measurements by Keith F. Eckerman on “Dosimetry of Internal Emitters: Contributions of Radiation Protection Bodies and Radiological Events” and the 12th Annual Warren K. Sinclair Keynote Address by Kenneth R. Kase on “Influence of NCRP on Radiation Protection in the United States: Guidance and Regulation.” The first Thomas S. Tenforde Topical Lecture was by Jacques Lochar on “Ethics and Radiation Protection” [Health Phys. **110**(2), (2016)]. Another innovation was the first publication of the Members’ Dinner talk: former NRC Chairman Allison Macfarlane’s presentation and publication was on “Radiation and Regulation in a Post-Fukushima World” [Health Phys. **110**(2), 118–122 (2016)]. An informative summary by Richard E. Toohey with accompanying photographs by Casper Sun were published in the May 2015 issue of *Health Physics News!*
- Statement No. 12, *Where are the Radiation Professionals (WARP)?* was published in 2015. It succinctly summarizes initiatives to address the national crisis of the dwindling number of radiation professionals, judged to be insufficient to meet the needs of our nation. Unmet needs are not only in emergency response, but also in regulation, medicine, occupation, and environment (*i.e.*, all aspects of radiation exposure to the population). CC 2 will continue this initiative. The 2016 Annual Meeting will cover the topic in its entirety.

Active committees are preparing the reports and commentaries highlighted at the beginning of the President’s Message. In addition, NCRP has continued to move forward to address the evolving and challenging issues of radiation protection facing our nation. These include:

- To draw younger professions into the protection arena, we continue our partnership with RRS for travel support for young scientists to attend the annual meeting. Three were able to attend in 2015 and three are planned for 2016.
- We partner with HPS to improve the conduct of our mission to enhance radiation protection in the United States. We were an instrumental part of the 2016 mid-year meeting on TENORM in Austin, Texas and we plan a similar presence at the 2017 mid-year meeting in Bethesda, Maryland on “Radiation Protection and Nuclear Power.”
- The CC 1 very early draft report on Radiation Protection Guidance for the United States is to begin general review this April 2016 with Program Area Committees (PACs) and ICRP. During the next year presentations are planned at the International Radiation Protection Association meeting in Cape Town, South Africa; the HPS meeting in Spokane, Washington; the RRS meeting in Hawaii; the Radiation Protection Week (Melodi, European Radiation Dosimetry Group) in Oxford, United Kingdom; and others. We expect significant changes and improvements as we converge on a docu-

ment that will be useful for the United States: practical, implementable, and easy to understand. It will strive to provide adequate protection against the adverse consequences of radiation without unduly limiting the beneficial uses. A tall order! But with the help of the Council and over a year to improve, we should be successful.

- We partner with agencies with substantial interests and programs involving radiation and protection. These include the Centers for Disease Control and Prevention, DHS, DOD, DOE, EPA, NASA, National Nuclear Security Administration, U.S. Navy, NRC, and others. We are the Council for the nation and strive to meet the needs of our country in all facets of radiation protection.
- We are improving the PAC structure in having, for the third time, full PAC meetings just before the annual meeting, and then a joint session of all PACs afterwards to present current activities and future plans and visions. This rewarding experience, begun in 2014, has become a mainstay of the annual meeting. A new innovation for 2015 was the individual publication of PAC activities and vision by their chairmen.
- Issues surrounding radiofrequencies could be considered in the future such as cell phone exposures and other uses of nonionizing radiation. The NCRP Advisory Panel on Nonionizing Radiation was reconstituted in 2015.
- We need to become more attuned to the modern age of social media with Twitter[®], Facebook[®], YouTube[®], Instagram[®], and other approaches to outreach.
- NCRP negotiated with the American Association of Physicists in Medicine (AAPM) to make PDFs of NCRP publications available to their members. It is anticipated that this will provide wider distribution of NCRP recommendations as well as secure funding for a portion of our publication revenue. The program will be funded by the AAPM for a period of 5 y with an option to renew.
- NCRP worked with a professional website developer to enhance our online presence. The new site was up and running in 2015.
- NCRP continues to participate in meetings or conferences of HPS, ICRP, the NRC Regulatory Information Conference, RRS, the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), and more. These venues increase NCRP visibility and impact.
- Approaches to improve radiation risk communication, perception and outreach. The President met with personnel at Consumer Reports along with ACR members to discuss effective communications of CT risks and benefits. He provides interviews with the *New York Times* and other media on issues ranging from cellular telephones to Fukushima.
- Expanding our efforts in medicine, such as quality management of radiological medical imaging and electronic tracking patient exposures. Updating the medical component of NCRP Report No. 160 is being considered.
- The President is on the 2024 IRPA North American Bid Task Force trying to secure the International Conference in Orlando. The topic proposed is on “Harmonization in Radiation Protection Issues.” The President will be honored at the 2016 IRPA Conference in Cape Town, South Africa by receiving the Sievert Award. Lauriston S. Taylor was the only other American to receive this award since its offering 50 y ago.

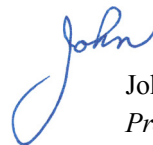
- The President remains on the ICRP Main Commission (first elected in 1997) and is now the alternate U.S. Representative to UNSCEAR (first appointed on the delegation by the State Department in 1993).

NCRP reports, activities, members, programs and more can be found on the website <http://NCRP-online.org>. The NCRP program of activities made possible by the partnership and financial support from many government agencies including CDC, DHS, DOD, DOE, EPA, NASA, NCI, and NRC. Gifts from our corporate sponsors and many collaborating organizations remain critical to our continued success and are gratefully acknowledged.

It is with great sadness that I recognize the passing of four NCRP Council members and wonderful individuals, and also personal friends who died in 2015:

- William J. Bair (July 14, 1924 – May 19, 2015) was a Council and Distinguished Emeritus member since 1974;
- William M. Beckner (November 7, 1932 – August 12, 2015) was the second Executive Director of the NCRP serving 1982 through 2002;
- Gerald D. Dodd, Jr. (November 18, 1922 – September 25, 2015) was a Council and Distinguished Emeritus member since 1979; and
- William F. Morgan (December 23, 1952 – November 13, 2015) who was a Council member since 2002.

Finally, NCRP remains a dynamic and influential organization only because of the generous contributions of time and knowledge contributed by Council members, the senior vice president, scientific vice presidents, committee members, Board of Directors, consultants, and the NCRP staff! These continue to be exciting times, challenging times, changing time and opportunities abound. We are only limited by our imaginations (and shrinking budgets!). We balance two issues in management articulated by Admiral Rickover – the need to embrace innovation without losing sight or capitulating to the process (the routine hard work) that got NCRP where we are today and keeps us on an even keel. Our goal remains to be efficient, effective and productive, with a broad view for the future with ideas and visions to address the needs of the nation as we meet together the challenges of radiation protection for the 21st century! Your help, guidance and financial support are essential for the future of NCRP.



John D. Boice, Jr.
President

Membership

There are 100 Council Members serving six-year terms. There are normally 15 to 19 vacancies each year. Election of Council Members is based on nominations made by committee chairmen, current and Distinguished Emeritus 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, molecular and cellular biology, nuclear energy, nuclear medicine, pathology, physics, public health, public policy, radiation measurements, radiation therapy, radiobiology, radiology, risk analysis and communication, statistics, and waste management. In 2015 there were 15 vacancies; eight new members were elected, and seven members were re-elected. The eight new members were:

Armin Ansari	William E. Irwin
Daniel J. Barnett	Katherine A. Kiel
Daniel J. Blumenthal	Mahadevappa Mahesh
Eric M. Goldin	Donald M. Mayer

2015 Council Membership

Sally A. Amundson	Columbia University Medical Center	2010–2016
Armin Ansari	Centers for Disease Control and Prevention	2015–2021
A. Iulian Apostoaei	Oak Ridge Center for Risk Analysis	2012–2018
Kimberly E. Applegate	Emory University School of Medicine	2013–2019
Edouard I. Azzam	Rutgers, The State University of New Jersey	2012–2018
Judith L. Bader	U.S. Department of Health & Human Services	2014–2020
Stephen Balter	Columbia-Presbyterian Medical Center	2013–2019
Daniel J. Barnett	Johns Hopkins Bloomberg School of Public Health	2015–2021
Steven M. Becker	Old Dominion University	2011–2017
Joel S. Bedford	Colorado State University	2010–2016

Jonine L. Bernstein	Memorial Sloan-Kettering Cancer Center	2012–2018
Eleanor A. Blakely	Lawrence Berkeley National Laboratory	2012–2018
William F. Blakely	Armed Forces Radiobiology Research Institute	2015–2021
Daniel J. Blumenthal	U.S. Department of Energy	2015–2021
John D. Boice, Jr.	National Council on Radiation Protection and Measurements	2012–2018
Wesley E. Bolch	University of Florida	2011–2017
Michael Boyd	U.S. Environmental Protection Agency	2014–2020
Richard R. Brey	Idaho State University	2013–2019
James A. Brink	Massachusetts General Hospital	2011–2017
Brooke R. Buddemeier	Lawrence Livermore National Laboratory	2015–2021
Jerrold T. Bushberg	University of California, Davis	2014–2020
Polly Y. Chang	SRI International	2011–2017
S.Y. Chen	Illinois Institute of Technology	2011–2017
Lawrence L. Chi	General Electric Hitachi Nuclear Energy Americas	2010–2016
Mary E. Clark	U.S. Environmental Protection Agency	2014–2020
Donald A. Cool	Electric Power Research Institute	2013–2019
Michael L. Corradini	University of Wisconsin, Madison	2010–2016
Allen G. Croff	Retired	2010–2016
Francis A. Cucinotta	University of Nevada, Las Vegas	2013–2019
Lawrence T. Dauer	Memorial Sloan-Kettering Cancer Center	2012–2018
Christine A. Donahue	CB&I	2015–2021
Joseph R. Dynlacht	Indiana University School of Medicine	2014–2020
Andrew J. Einstein	Columbia University	2012–2018
Patricia A. Fleming	Saint Mary's College, Notre Dame	2015–2021
Norman C. Fost	University of Wisconsin – Madison	2011–2017
Donald P. Frush	Duke University Medical Center	2010–2016
Ronald E. Goans	MJW Corporation	2013–2019
Eric M. Goldin	Retired	2015–2021
Helen A. Grogan	Cascade Scientific, Inc.	2014–2020
Milton J. Guiberteau	Greater Houston Radiology Associates	2010–2016
Martin Hauer-Jensen	University of Arkansas for Medical Sciences	2010–2016
Kathryn D. Held	Massachusetts General Hospital	2012–2018
Kathryn A. Higley	Oregon State University	2014–2020
Roger W. Howell	Rutgers, The State University of New Jersey	2015–2021
William E. Irwin	Vermont Department of Health	2015–2021
Hank C. Jenkins-Smith	University of Oklahoma	2010–2016
Cynthia G. Jones	U.S. Nuclear Regulatory Commission	2011–2017
Timothy J. Jorgensen	Georgetown University Medical Center	2013–2019
William E. Kennedy, Jr.	Dade Moeller & Associates, Inc.	2010–2016

Katherine A. Kiel	College of the Holy Cross	2015–2021
David C. Kocher	Oak Ridge Center for Risk Analysis	2011–2017
Amy Kronenberg	Lawrence Berkeley National Laboratory	2011–2017
Susan M. Langhorst	Washington University School of Medicine	2011–2017
John J. Lanza	Florida Department of Health	2010–2016
Edwin M. Leidholdt, Jr.	U.S. Department of Veterans Affairs	2012–2018
Martha S. Linet	National Cancer Institute	2010–2016
Jonathan M. Links	Johns Hopkins University Bloomberg School of Public Health	2011–2017
Jill A. Lipoti	Retired	2013–2019
Paul A. Locke	Johns Hopkins University	2010–2016
Mahadevappa Mahesh	Johns Hopkins Hospital	2015–2021
Donald M. Mayer	Indian Point Energy Center	2015–2021
Ruth E. McBurney	Conference of Radiation Control Program Directors, Inc.	2013–2019
Charles W. Miller	Consultant	2012–2018
Donald L. Miller	Food and Drug Administration	2012–2018
William H. Miller	University of Missouri, Columbia	2011–2017
William F. Morgan [†]	Pacific Northwest National Laboratory	2014–2020
Stephen V. Musolino	Brookhaven National Laboratory	2014–2020
Bruce A. Napier	Pacific Northwest National Laboratory	2014–2020
Gregory A. Nelson	Loma Linda University Medical Center	2012–2018
Wayne D. Newhauser	Louisiana State University	2013–2019
Harald Paganetti	Massachusetts General Hospital	2012–2018
David J. Pawel	U.S. Environmental Protection Agency	2011–2017
Kathryn H. Pryor	Pacific Northwest National Laboratory	2010–2016
Sara Rockwell	Yale School of Medicine	2011–2017
Adela Salame-Alfie	Centers for Disease Control and Prevention	2015–2021
Ehsan Samei	Duke University Medical Center	2013–2019
Debra M. Scroggs	DMcS Consulting	2012–2018
J. Anthony Seibert	University of California Davis Medical Center	2014–2020
Stephen M. Seltzer	National Institute of Standards and Technology	2010–2016
George Sgouros	Johns Hopkins University School of Medicine	2013–2019
Steven L. Simon	National Cancer Institute	2010–2016
Christopher G. Soares	National Institute of Standards and Technology	2011–2017
Michael G. Stabin	Vanderbilt University	2010–2016
Michael D. Story	University of Texas, Southwestern Medical Center at Dallas	2014–2020
Daniel O. Stram	University of Southern California	2013–2019

[†]Deceased during 2015.



Steven G. Sutlief	University of California, San Diego	2012–2018
Tammy P. Taylor	Pacific Northwest National Laboratory	2010–2016
Julie K. Timins	Diagnostic Radiology	2010–2016
Richard E. Toohey	M.H. Chew	2012–2018
Louis K. Wagner	University of Texas-Houston Medical School	2010–2016
Michael M. Weil	Colorado State University	2011–2017
Chris G. Whipple	Ramboll Environ	2013–2019
Robert C. Whitcomb, Jr.	Centers for Disease Control and Prevention	2014–2020
Jacqueline P. Williams	University of Rochester Medical College	2012–2018
Gayle E. Woloschak	Northwestern University	2015–2021
Shiao Y. Woo	University of Louisville	2011–2017
X. George Xu	Rensselaer Polytechnic Institute	2014–2020
R. Craig Yoder	Landauer, Inc.	2014–2020
Cary Zeitlin	Southwest Research Institute	2014–2020
Gary H. Zeman	Illinois Institute of Technology	2011–2017

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James A. Brink	William E. Kennedy, Jr.	Richard E. Toohey
Jerrold T. Bushberg	Ruth E. McBurney	Gayle E. Woloschak
	Bruce A. Napier	

*Newly elected to the Board of Directors on March 17, 2015.

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Senior Vice President	Jerrold T. Bushberg
Secretary and Treasurer	David A. Smith

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 W. Roger Ney, *Executive Director Emeritus*
 David A. Schauer, *Executive Director Emeritus*

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 John F. Ahearne
 Lynn R. Anspaugh
 Benjamin R. Archer
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 Thomas B. Borak
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 J. Donald Cossairt
 Paul M. DeLuca
 Gerald D. Dodd[†]
 Sarah S. Donaldson
 William P. Dornsife
 Keith F. Eckerman
 Thomas S. Ely
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 Kenneth L. Miller
 A. Alan Moghissi
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 Marvin Rosenstein
 Lawrence N. Rothenberg
 Henry D. Royal
 Michael T. Ryan
 William J. Schull
 Roy E. Shore
 Paul Slovic
 Daniel J. Strom
 John E. Till
 Lawrence W. Townsend
 Robert L. Ullrich
 Arthur C. Upton[†]
 Richard J. Vetter
 F. Ward Whicker
 Susan D. Wiltshire
 Marvin C. Ziskin

[†]Deceased during 2015.

*Elected to Distinguished Emeritus Membership March 17, 2015.

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 Distinguished Emeritus membership.

Peter R. Almond	Everett G. Fuller	Peter C. Nowell
E. Stephen Amis, Jr.	Barry B. Goldberg	Eugene F. Oakberg
Larry E. Anderson	Robert L. Goldberg	Gilbert S. Omenn
Mary M. Austin-Seymour	Marvin Goldman	Frank L. Parker
John W. Baum	John D. Graham	Terry C. Pellmar
Merrill A. Bender	Douglas Grahn	Lester J. Peters
Mythreyi Bhargavan-Chatfield*	Andrew J. Grosovsky	Ronald C. Petersen
B. Gordon Blaylock	Ellis M. Hall	Abram Recht
Frederick J. Bonte	Roger W. Harms	Allan C.B. Richardson
Harold S. Boyne	Robert J. Hasterlik	Robert Robbins
John W. Brand	John M. Heslep	Lester Rogers
David J. Brenner	John W. Hirshfeld, Jr.	Robert E. Rowland
A. Bertrand Brill	David G. Hoel	Jonathan M. Samet
Thomas F. Budinger	George B. Hutchison	Keith J. Schiager
John F. Cardella	A. Everette James, Jr.	Robert A. Schlenker
Stephanie K. Carlson	John R. Johnson	Beth A. Schueler*
Paul L. Carson	James G. Kereiakes	Thomas M. Seed
Donald K. Chadwick	H. William Koch	Ferdinand J. Shore
Charles E. Chambers	Harold L. Kundel	Edward A. Sickles
Chung-Kwang Chou	Richard W. Leggett	Kenneth W. Skrable
Kelly L. Classic	George R. Leopold	David H. Sliney
Stephen F. Cleary	Howard L. Liber	Louise C. Strong
James E. Cleaver	James C. Lin	Herman D. Suit
Fred T. Cross	Thomas A. Lincoln	Richard A. Tell
Stanley B. Curtis	David I. Livermore	Joop W. Thiessen
John F. Dicello	Richard A. Luben	Ralph H. Thomas
Richard L. Doan	Jay H. Lubin	Elizabeth L. Travis*
Carl H. Durney	Arthur C. Lucas	Lois B. Travis
David A. Eastmond	Harry R. Maxon	Fong Y. Tsai
Marc Edwards	C. Douglas Maynard	John C. Villforth
Charles M. Eisenhauer	Claire M. Mays	Daniel E. Wartenberg
Joe A. Elder	Cynthia H. McCollough	Stuart C. White*
Edward R. Epp	Mortimer L. Mendelsohn	J. Frank Wilson
Alan J. Fischman*	Jack Miller	Andrew J. Wyrobek
H. Keith Florig	William A. Mills	Marco A. Zaidar
Kenneth R. Foster	John E. Moulder	Pat B. Zanzonico
	Andrea K. Ng*	

*Elected to Consociate Membership March 17, 2015.

Administrative Committees

Budget & Finance Committee (appointed by the Board of Directors, March 17, 2015)

Richard E. Toohey, *Chairman*

Jerrold T. Bushberg
William E. Kennedy, Jr.

Ruth E. McBurney
R. Craig Yoder

Nominating Committee (appointed by the Board of Directors, March 17, 2015)

Donald L. Miller, *Chairman*

Christine A. Donahue
Kathryn D. Held

Paul A. Locke
Kathryn H. Pryor

Program Committee for 2016 Annual Meeting

(appointed by the Board of Directors, March 17, 2015)

Judith L. Bader, Kathryn H. Pryor & Richard E. Toohey, *Co-Chairs*

Donald P. Frush
Pamela J. Henderson
Jerry W. Hiatt
Kathryn A. Higley
William E. Kennedy

Chad A. Mitchell
Wayne D. Newhauser
Robert C. Whitcomb, Jr.
Jacqueline P. Williams
Patricia R. Worthington

Scientific and Administrative Staff

David A. Smith	Executive Director
Laura J. Atwell	Office Manager
Joel E. Gray	Technical Staff Consultant
Michael P. Grissom	Technical Staff Consultant
Cindy L. O'Brien	Managing Editor
R. Julian Preston	Advisor to the President
Marvin Rosenstein	Technical Staff Consultant
David A. Schauer	Executive Director Emeritus
Roy E. Shore	Advisor to the President
Richard E. Toohey	Advisor to the President
Lawrence W. Townsend	Technical Staff Consultant
Richard J. Vetter	Technical Staff Consultant
Myrna A. Young	Financial Records Manager

Program Area Committees and Advisory Panels

The program area and advisory committees advise the NCRP President and 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 two Council committees, seven program area committees, and an advisory panel. They are:

Council Committee

Radiation Protection Guidance for the United States
Meeting the Needs of the Nation for Radiation Protection

Program Area Committees

Basic Criteria, Epidemiology, Radiobiology, and Risk	Kathryn D. Held Gayle E. Woloschak
Operational Radiation Safety	Kathryn H. Pryor
Nuclear and Radiological Security and Safety	Tammy P. Taylor Brooke R. Buddemeier
Radiation Protection in Medicine	James A. Brink Donald L. Miller
Environmental Radiation and Radioactive Waste Issues	S.Y. Chen Bruce A. Napier
Radiation Measurements and Dosimetry	Steven L. Simon
Radiation Education, Risk Communication, Outreach, and Policy	Steven M. Becker Paul A. Locke

Advisory Panel

Nonionizing Radiation

Vice Presidents

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

- Chair their program area committee
- Provide recommendations for new work in their area
- Represent NCRP to federal agencies and other potential supporters

- Represent NCRP at scientific meetings
- Advise on membership of their program area committee
- Assist NCRP President and chairmen of new scientific committees with selection of potential committee or advisory members
- Assist in management of scientific committee efforts
- Provide the chairman of the nominating committee with potential candidates for Council membership
- Review all draft publications within their program area committee prior to Council review

Radiation Protection Guidance for the United States

Chair, John D. Boice, Jr.

Key Functions of Council Committee (CC) 1

- Update and expand NCRP Report No. 116 (1993), *Limitation of Exposure to Ionizing Radiation*, with regard to radiation protection as it pertains to the United States.
- Incorporate substantial advances in radiation effects knowledge as well as radiation protection understanding and culture.

Members of CC 1

Status: Middle drafting stage

John D. Boice, Jr., *Chair*

Kenneth R. Kase, *Co-Chair*

Armin Ansari

Jerrold T. Bushberg

Lawrence T. Dauer

Darrell R. Fisher

Patricia A. Fleming

Kathryn A. Higley

Randall N. Hyer

William E. Irwin

Fred A. Mettler, Jr.

Donald L. Miller

R. Julian Preston

Gayle E. Woloschak

John E. Till, *Liaison PAC 7*

S. James Adelstein, *Consultant*

Ralph Andersen, *Consultant*

Michael Boyd, *Consultant*

Donald A. Cool, *Consultant*

Marvin Rosenstein, *Technical Staff Consultant*

Meeting the Needs of the Nation for Radiation Protection

Chair, Richard E. Toohey

Key Functions of Council Committee (CC) 2

- Monitor graduation and employment statistics for radiation professionals, including but not limited to health physicists, radiobiologists, radioecologists, radiologists, radiation oncologists, nuclear medicine physicians, radiochemists, radiation protection engineers, and allied disciplines.
- Continually assess, revise and renew the comprehensive plan initiated with *Where Are the Radiation Professionals?* (WARP).
- Promote a government led initiative to develop and strengthen human capital in radiation science and radiation protection.

Members of CC 2

Richard E. Toohey, *Chair*
 John D. Boice, Jr., *Co-Chair*
 Kathryn H. Pryor, *Co-Chair*
 Adela Alfie-Salame
 Judith L. Bader
 Daniel J. Blumenthal
 Donald P. Frush
 Pamela Henderson
 Jerry W. Hiatt
 Kathryn A. Higley
 William E. Kennedy, Jr.
 Chad A. Mitchell
 Wayne D. Newhauser
 Michael A. Noska
 Michael Weber
 Robert C. Whitcomb, Jr.
 Jacqueline P. Williams
 Gayle E. Woloschak
 Patricia R. Worthington

Completed in 2015

NCRP Statement No. 12, *Where are the Radiation Professionals (WARP)?*, was issued in 2015. This Statement was drafted by Council Committee 2 under the chairmanship of Richard E. Toohey.

Basic Criteria, Epidemiology, Radiobiology, and Risk

Vice President, Kathryn D. Held

Key Functions of Program Area Committee (PAC) 1

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

Members of PAC 1

Kathryn D. Held, *Vice President*
Sally A. Amundson
Edouard I. Azzam
Joel S. Bedford
Jonine L. Bernstein
Ann R. Kennedy
Amy Kronenberg
Gregory A. Nelson
George Sgouros
Roy E. Shore
Michael D. Story
Daniel O. Stram
Michael M. Weil
Jacqueline P. Williams
Gayle E. Woloschak
John D. Boice, Jr., *NCRP Contact*

Active Scientific Committees Under PAC 1

SC 1-20 Biological Effectiveness of Photons as a Function of Energy

Status: Preparing for PAC review

Steven L. Simon, *Chair*

Leslie A. Braby

Polly Y. Chang

Dudley Goodhead

Stephen C. Hora

David C. Kocher

Kiyohiko Mabuchi

Jerome S. Puskin

David Richardson

James D. Tucker

Eliseo Vano
Marvin Rosenstein, *Technical Staff Consultant*

SC 1-23 **Guidance on Radiation Dose Limits for the Lens of the Eye**

Status: Preparing for Council review

Eleanor A. Blakely, *Co-Chair*

Lawrence T. Dauer, *Co-Chair*

Joseph R. Dynlacht

David G. Hoel

Barbara Klein

Donald Mayer

Christina R. Prescott

Raymond Thornton

Eliseo Vano

Gayle E. Woloschak

Cindy Flannery, *Consultant*

Phung Tran, *Consultant*

Michael P. Grissom, *Technical Staff Consultant*

SC 1-24 **Radiation Exposures in Space and the Potential for Central Nervous System Effects**

Status: Preparing printer's manuscript

Leslie A. Braby, *Co-Chair*

Richard S. Nowakowski, *Co-Chair*

Gregory Armstrong

Lee Goldstein

Kathryn D. Held

Gregory A. Nelson

James Root

Walter Schimmerling

Rudy Tanzi

Lawrence W. Townsend, *Consultant*

Marvin Rosenstein, *Technical Staff Consultant*

Authorized but Unfunded Activities

- lung cancer risks from inhaled radionuclides.

Completed in 2015

NCRP Commentary No. 24, *Health Effects of Low Doses of Radiation: Perspectives on Integrating Radiation Biology and Epidemiology*, was issued in 2015. This Commentary was drafted by Scientific Committee 1-21 under the chairmanship of Sally A. Amundson and Jonine L. Bernstein. Committee members included: Keith F. Eckerman, Raymond A. Guilmette, Amy Kronenberg, Mark P. Little, William F. Morgan, Jac A. Nickoloff, Simon N. Powell, and Daniel O. Stram; and Consultant, R. Julian Preston.

Operational Radiation Safety

Vice President, Kathryn H. Pryor

Key Functions of Program Area Committee (PAC) 2

- serve as a national resource for information on operational radiation safety; and
- formulate guidance regarding the application of operational radiation safety principles.

Members of PAC 2

Kathryn H. Pryor, *Vice President*
Edgar D. Bailey
Carol D. Berger
John R. Frazier
Eric M. Goldin
Michael Littleton
David S. Myers
John W. Poston, Sr.
Kathleen Shingleton
Glenn M. Sturchio
Joshua Walkowicz
James Willison
James G. Yusko
John D. Boice, Jr., *NCRP Contact*

Active Scientific Committees Under PAC 2

SC 2-6 Radiation Safety Aspects of Nanotechnology

Status: Preparing for Council review

Mark D. Hoover, *Chair*

David S. Myers, *Vice Chair*

Raymond A. Guilmette

Leigh J. Cash

Wolfgang G. Kreyling

Gunter Oberdoerster

Rachel Smith

Bruce B. Boecker, *Technical Staff Consultant*

Michael P. Grissom, *Technical Staff Consultant*



SC 2-7 Radiation Safety of Sealed Radioactive Sources

Status: Preparing for Council review

Kathryn H. Pryor, *Chair*

Edgar D. Bailey

John R. Frazier

Eric M. Goldin

Michael Littleton

David S. Myers

John W. Poston, Sr.

Kathleen Shingleton

Glen M. Sturchio

Joshua Walkowicz

James Willison

James L. Thompson, *Consultant*

Authorized but Unfunded Activities

- air monitoring;
- operational radiation safety in medical fusion imaging procedures;
- design of facilities and installed equipment for handling unsealed radioactive materials; and
- radiation protection guidelines for industrial accelerators and irradiators.

Nuclear and Radiological Security and Safety

Vice President, Tammy P. Taylor

Key Functions of Program Area Committee (PAC) 3

- identify important steps to be taken in the interdiction of, preparedness for, and effective responses to possible acts of nuclear or radiological terrorism;
- define performance requirements, instrumentation, and testing criteria for security surveillance systems;
- develop operational strategies and optimization procedures for early, intermediate and late-phase responses to a nuclear or radiological terrorism incident;
- recommend effective methods for protecting against, mitigating, and treating traumatic injuries and long-term health and psychological effects of radiation exposure and other immediate stress effects such as thermal burns, shock, and contaminated shrapnel wounds resulting from a nuclear or radiological explosions to possible acts of nuclear or radiological terrorism;
- analyze methods for optimizing the cleanup, site restoration, and disposition of contaminated materials resulting from a nuclear or radiological terrorism incident; and
- develop operational strategies and optimization procedures for early, intermediate and late-phase responses to a nuclear or radiological terrorism incident.

Members of PAC 3

Tammy P. Taylor, *Vice President*
Brooke R. Buddemeier, *Co-Chair*
Daniel J. Blumenthal
Lawrence L. Chi
C. Norman Coleman
Nicholas Dainiak
Sara DeCair
John Donnelly
Joseph R. Dynlacht
Stephen V. Musolino
James D. Rogers
Adela Salame-Alfie
Thomas J. Seif
Benjamin Stevenson
John D. Boice, Jr., *NCRP Contact*



Active Scientific Committees Under PAC 3

SC 3-1 Guidance for Emergency Responder Dosimetry

Status: Middle drafting stage

Stephen V. Musolino, *Co-Chair*

Adela Salame-Alfie, *Co-Chair*

Judith L. Bader

Daniel Blumenthal

Brooke R. Buddemeier

Helen A. Grogan

William E. Irwin

Gladys Klemic

Ruth E. McBurney

Jeanine Prudhomme

Richard Schlueck

Tammy P. Taylor

Lawrence T. Dauer, *Consultant*

David A. Schauer, *Technical Staff Consultant*

Radiation Protection in Medicine

Vice President, James A. Brink

Key Functions of Program Area Committee (PAC) 4

- 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; and
- examine and evaluate training of medical personnel in radiation protection.

Members of PAC 4

James A. Brink, *Vice President*
Donald L. Miller, *Co-Chair*
Kimberly E. Applegate
Stephen Balter
Jerrold T. Bushberg
Charles E. Chambers
Lawrence T. Dauer
Andrew J. Einstein
Donald P. Frush
Ronald E. Goans
Joel E. Gray
Mannudeep K.S. Kalra
Linda A. Kroger
Edwin M. Leidholdt
Mahadevappa Mahesh
Fred A. Mettler, Jr.
Wayne D. Newhauser
Ehsan Samei
J. Anthony Seibert
Steven G. Sutlief
Julie E.K. Timins
Louis K. Wagner
Stuart C. White
Shiao Y. Woo
John D. Boice, Jr., *NCRP Contact*

Authorized but Unfunded Activities

- medical evaluation of workers; and
- revision of NCRP Report No. 102 on *Medical X-Rays, Electron Beam and Gamma-Ray Protection for Energies Up to 50 MeV* (1989).

Active Scientific Committees Under PAC 4

SC 4-5 Radiation Protection in Dentistry Supplement: Cone Beam Computed Tomography, Digital Imaging and Handheld Dental Imaging

Status: Preparing for PAC review

Alan G. Lurie, *Co-Chair*

Mel L. Kantor, *Co-Chair*

Mansur Ahmad

Veeratrishual Allareddy

John B. Ludlow

Edwin T. Parks

Eleonore D. Paunovich

Robert J. Pizzutiello

Robert A. Sauer

David C. Spelic

Edwin M. Leidholdt, *Consultant*

W. Doss McDavid, *Consultant*

Donald L. Miller, *Consultant*

Joel E. Gray, *Technical Staff Consultant*

SC 4-7 Evaluating and Communicating Radiation Risks for Studies Involving Human Subjects: Guidance for Researchers and Reviewing Bodies

Status: Middle drafting stage

Julie E.K. Timins, *Chair*

Jerrold T. Bushberg

Linda A. Kroger

Edwin M. Leidholdt, Jr.

Donald L. Miller

Robert E. Reiman

J. Anthony Seibert

Patricia A. Fleming, *Consultant*

Steven G. Sutlief, *Consultant*

Michael P. Grissom, *Technical Staff Consultant*

SC 4-8 Improving Patient Dose Utilization in Computed Tomography

Status: Early drafting stage

Mannudeep K.S. Kalra, *Chair*

John M. Boone

Donald P. Frush
Edwin M. Leidholdt, Jr.
Ehsan Samei
Michael McNitt-Gray, *Consultant*

Environmental Radiation and Radioactive Waste Issues

Vice President, S.Y. Chen

Key Functions of Program Area Committee (PAC) 5

- serve as a national resource for environmental radiation and radioactive waste information and data;
- prepare scientific reports, commentaries and statements that can be used as fundamental scientific references dealing with radionuclides in the environment;
- help formulate NCRP recommendations on disposal of radioactive and mixed wastes;
- encourage scientific and technical discourse on the disposal of radioactive and mixed wastes including environmental and human risk from disposal; and
- encourage scientific and technical discourse on the cost-benefit of activities generating radioactive and mixed wastes.

Members of PAC 5

S.Y. Chen, *Vice President*
Bruce A. Napier, *Co-Chair*
Mary E. Clark
Thomas Hinton
E. Vincent Holahan
William E. Kennedy, Jr.
Katherine A. Kiel
Jill A. Lipoti
Ruth E. McBurney
Brian A. Powell
Andrew Wallo, III
Chris G. Whipple
John D. Boice, Jr., *NCRP Contact*

Authorized but Unfunded Activities

- assessment of measurement methodologies for environmental indicators of past releases (joint with PAC 6);

- case studies and lessons learned from remediation of sites and facilities with radioactive contamination;
- clearance as a radiation protection strategy for radioactive material management;
- development of a risk assessment and risk management parameter handbook;
- radiation protection criteria for plants and animals;
- risk-based corrective actions in remediation of contaminated ecosystems; and
- usage factors for environmental dose calculations.

Radiation Measurements and Dosimetry

Vice President, Steven L. Simon

Key Functions of Program Area Committee (PAC) 6

- evaluate the field of radiation measurements and dosimetry;
- serve as a source of information to scientific committees preparing reports that include radiation measurements and dosimetry; and
- maintain liaison with other organizations and professional societies that have similar interests.

Members of PAC 6

Steven L. Simon, *Vice President*
Luiz Bertelli
William F. Blakely
Wesley E. Bolch
Leslie A. Braby
John F. Dicello
Raymond A. Guilmette
Richard T. Kouzes
Jeffrey J. Whicker
Gary H. Zeman
John D. Boice, Jr., *NCRP Contact*

Active Scientific Committees Under PAC 6

SC 6-9 U.S. Radiation Workers and Nuclear Weapons Test Participants Radiation Dose Assessment

Status: Middle drafting stage

Andre Bouville, *Chair*

Richard E. Toohey, *Co-Chair*

Harold L. Beck

Lawrence T. Dauer

Keith F. Eckerman

Derek Hagemeyer

Bruce A. Napier
Kathryn H. Pryor
David A. Schauer
Daniel O. Stram
James L. Thompson
John E. Till
R. Craig Yoder
Cary Zeitlin
Terry Brock, *Consultant*
Richard W. Leggett, *Consultant*
Donald L. Miller, *Consultant*
Marvin Rosenstein, *Technical Staff Consultant*

Authorized but Unfunded Activities

- Aerosol measurements
- Biological dosimetry
- Requirements and methods for recording information for accurate dose reconstruction in nuclear or radiological incidents
- Update of Report 58, A Handbook of Radioactivity Measurements
- Wound model dose coefficients

Radiation Education, Risk Communication, Outreach, and Policy

Vice President, Steven M. Becker

Key Functions of Program Area Committee (PAC) 7

- identify the policy implications of NCRP publications, meetings and other events, and seek to communicate those implications in a credible and comprehensible manner to policy makers and the public;
- suggest members or serve as members of new NCRP scientific committees whose topics relate to education, risk communication, policy, and outreach;
- provide advice, wording, and strategic outreach options to policy makers and the public for NCRP reports;
- ensure that NCRP communications and outreach emphasize NCRP's paramount role in providing scientific information and develop communications and outreach strategies so that recommendations are of maximum assistance to policy makers; and
- bolster educational efforts aimed at recruiting, training and retaining radiation health professionals.

Members of PAC 7

Steven M. Becker, *Vice President*
 Paul A. Locke, *Co-Chair*
 John F. Ahearne
 Jerrold T. Bushberg
 Francis X. Cameron
 Hank C. Jenkins-Smith
 Jill A. Lipoti
 Charles W. Miller
 William F. Morgan
 Dennis O'Connor
 Debra McBaugh Scroggs
 John E. Till
 Julie E.K. Timins
 John D. Boice, Jr., *NCRP Contact*

Nonionizing Radiation

Key Functions of Nonionizing Radiation Panel

- Analyze mechanisms of interaction of nonionizing radiation with biological systems, including humans
- Identify biological responses and potential human health effects
- Evaluate theoretical and applied aspects of dosimetry and exposure assessment of humans to nonionizing radiation
- Provide recommendations on acceptable exposure levels for nonionizing radiation in occupational, medical and public environments
- Analyze procedures for mitigating exposure in public and occupational settings

Members of Advisory Panel

Jerrold T. Bushberg, *Chairman*
Chung-Kwang Chou
Joseph A. Elder
Kenneth R. Foster
David A. Savitz
Richard A. Tell
Marvin C. Ziskin
John D. Boice, Jr., *NCRP Contact*

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 granted collaborating status by NCRP. Collaborating Organizations provide a means by which 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 documents 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 documents and to identify problems that might result from proposed recommendations. The Collaborating Organizations for the year 2015 are:

Organization

American Academy for Dermatology
 American Academy of Environmental Engineers
 American Academy of Health Physics
 American Academy of Orthopaedic Surgeons
 American Association of Physicists in Medicine
 American Brachytherapy Society
 American College of Cardiology
 American College of Medical Physics
 American College of Nuclear Physicians
 American College of Occupational and Environmental
 Medicine
 American College of Radiology
 American Conference of Governmental Industrial
 Hygienists
 American Dental Association
 American Industrial Hygiene Association
 American Institute of Ultrasound in Medicine
 American Medical Association

American Nuclear Society
American Pharmacists Association
American Podiatric Medical Association
American Public Health Association
American Radium Society
American Roentgen Ray Society
American Society for Radiation Oncology
American Society of Emergency Radiology
American Society of Health-System Pharmacists
American Society of Nuclear Cardiology
American Society of Radiologic Technologists
American Thyroid Association
Association of Educators in Imaging and Radiological Sciences
Association of University Radiologists
Bioelectromagnetics Society
Campus Radiation Safety Officers
College of American Pathologists
Conference of Radiation Control Program Directors, Inc.
Council on Radionuclides and Radiopharmaceuticals
Defense Threat Reduction Agency
Electric Power Research Institute
Federal Aviation Administration
Federal Communications Commission
Federal Emergency Management Agency
Genetics Society of America
Health Physics Society
Institute of Electrical and Electronics Engineers, Inc.
Institute of Nuclear Power Operations
International Brotherhood of Electrical Workers
International Society of Exposure Science
National Aeronautics and Space Administration
National Association of Environmental Professionals
National Center for Environmental Health / Agency for Toxic Substances and Disease Registry



National Electrical Manufacturers Association
National Institute for Occupational Safety and Health
National Institute of Standards and Technology
Nuclear Energy Institute
Office of Science and Technology
Paper, Allied-Industrial, Chemical and Energy Workers
International Union
Product Stewardship Institute
Radiation Research Society
Radiological Society of North America
Society for Cardiovascular Angiography and Interventions
Society for Pediatric Radiology
Society for Risk Analysis
Society of Cardiovascular Computed Tomography
Society of Chairmen of Academic Radiology Departments
Society of Interventional Radiology
Society of Nuclear Medicine and Molecular Imaging
Society of Radiologists in Ultrasound
Society of Skeletal Radiology
U.S. Air Force
U.S. Army
U.S. Coast Guard
U.S. Department of Energy
U.S. Department of Housing and Urban Development
U.S. Department of Labor
U.S. Department of Transportation
U.S. Environmental Protection Agency
U.S. Navy
U.S. Nuclear Regulatory Commission
U.S. Public Health Service
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 NCRP; (2) that the individual designated will receive copies of draft NCRP publications (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 2015 are:

Organization

Australian Radiation Protection and Nuclear Safety Agency
Bundesamt für Strahlenschutz (Germany)
(Federal Office for Radiation Protection)
Canadian Association of Medical Radiation Technologists
Canadian Nuclear Safety Commission
Central Laboratory for Radiological Protection (Poland)
China Institute for Radiation Protection
Commissariat à l'Énergie Atomique (France)
Commonwealth Scientific Instrumentation Research
Organization (Australia)
European Commission
Heads of the European Radiological Protection Competent
Authorities
Health Council of the Netherlands
Health Protection Agency
International Commission on Non-Ionizing Radiation
Protection
International Commission on Radiation Units and
Measurements
International Commission on Radiological Protection
International Radiation Protection Association
Japan Radiation Council



Korea Institute of Nuclear Safety
Nuclear Safety Commission of Japan
Russian Scientific Commission on Radiation Protection
South African Forum for Radiation Protection
World Association for Nuclear Operators
World Health Organization, Unit of Radiation and
Environmental Health

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 2015 are:

Organization

3M

Landauer, Inc.

Nuclear Energy Institute

Review Process

The review process for draft publications is elaborate and comprehensive. It begins with a review by a group of critical reviewers designated by the appropriate Program Area Committee Vice President and the NCRP Secretariat. Second, following modification of the draft on the basis of the comments of the critical reviewers, the publication is submitted for review to the full Council membership (100), Distinguished Emeritus Members (73), Collaborating Organizations (79), and Special Liaison Organizations (23). At the time a draft is submitted for Council review it is also placed on NCRP's website for public comment (<http://NCRPonline.org>). Further modification of draft reports on the basis of the comments received follows, with the goal of reaching a scientific consensus on the material included in the report. An NCRP report can be released for publication by the President 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 commentaries, statements, and presidential 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. Statements are brief documents 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. 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 Board of Directors and the President.

Lauriston S. Taylor Lectures

Year	Title	Lecturer
2015	Dosimetry of Internal Emitters: Contributions of Radiation Protection Bodies and Radiological Events	Keith F. Eckerman
2014	On the Shoulders of Giants: Radiation Protection Over 50 Years	Fred A. Mettler, Jr.
2013	When Does Risk Assessment Get Fuzzy?	John E. Till
2012	From the Field to the Laboratory and Back: The <i>What Ifs</i> , <i>Wows</i> , and <i>Who Cares</i> of Radiation Biology	Antone L. Brooks
2011	What Makes Particle Radiation so Effective?	Eleanor A. Blakely
2010	Radiation Protection and Public Policy in an Uncertain World	Charles E. Land
2009	Radiation Epidemiology: The Golden Age and Remaining Challenges	John D. Boice, Jr.
2008	Radiation Standards, Dose/Risk Assessments, Public Interactions, and Yucca Mountain: Thinking Outside the Box	Dade W. Moeller
2007	The Quest for Therapeutic Actinide Chelators	Patricia W. Durbin
2006	Fifty Years of Scientific Investigation: The Importance of Scholarship and the Influence of Politics and Controversy	Robert L. Brent
2005	Nontargeted Effects of Radiation: Implications for Low-Dose Exposures	John B. Little
2004	Radiation Protection in the Aftermath of a Terrorist Attack Involving Exposure to Ionizing Radiation	Abel J. Gonzalez
2003	The Evolution of Radiation Protection: From Erythema to Genetic Risks to Risks of Cancer to ?	Charles B. Meinhold
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

Warren K. Sinclair Keynote Addresses

Year	Title	Lecturer
2015	Influence of NCRP on Radiation Protection in the United States: Guidance and Regulation	Kenneth R. Kase
2014	Science, Radiation Protection, and the NCRP: Building on the Past, Looking to the Future	Jerrold T. Bushberg
2013	Fukushima Nuclear Power Plant Accident and Comprehensive Health Risk Management	Shunichi Yamashita
2012	Childhood Exposure: An Issue from Computed Tomography Scans to Fukushima	Fred A. Mettler, Jr.
2011	Heavy Ions in Therapy and Space: Benefits and Risks	Marco Durante
2010	Effective Risk Communication Before, During and After a Radiological Emergency: Challenges, Guidelines, Strategies and Tools	Vincent T. Covello
2009	The Role of a Strong Regulator in Safe and Secure Nuclear Energy	Peter B. Lyons
2008	Issues in Quantifying the Effects of Low-Level Radiation	Dudley T. Goodhead
2007	Use and Misuse of Radiation in Medicine	James A. Brink
2006	Retrospective Analysis of Impacts of the Chernobyl Accident	Mikhail Balonov
2005	Contemporary Issues in Risk-Informed Decision Making on Waste Disposition	B. John Garrick
2004	Current Challenges in Countering Radiological Terrorism	John W. Poston, Sr.

Thomas S. Tenforde Topical Lecture

Year	Title	Lecturer
2015	Ethics and Radiation Protection	Jacques Lochard

Annual Meetings

Year	Topic
2015	Changing Regulations and Radiation Guidance: What Does the Future Hold?
2014	NCRP: Achievements of the Past 50 Years and Addressing the Needs of the Future
2013	Radiation Dose and the Impacts on Exposed Populations
2012	Emerging Issues in Radiation Protection in Medicine, Emergency Response, and the Nuclear Fuel Cycle
2011	Scientific and Policy Challenges of Particle Radiations in Medical Therapy and Space Missions
2010	Communication of Radiation Benefits and Risks in Decision Making
2009	Future of Nuclear Power Worldwide: Safety, Health and Environment
2008	Low Dose and Low Dose-Rate Radiation Effects and Models
2007	Advances in Radiation Protection in Medicine
2006	Chernobyl at Twenty
2005	Managing the Disposition of Low-Activity Radioactive Materials
2004	Advances in Consequence Management for Radiological Terrorism Events
2003	Radiation Protection at the Beginning of the 21st Century—A Look Forward
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

2015 Annual Meeting

The Fifty-First Annual Meeting of NCRP was held March 16–17, 2015 at the Hyatt Regency Bethesda in Bethesda, Maryland. The topic of the meeting was Changing Regulations and Radiation Guidance: What Does the Future Hold?. The sessions and presentations were as follows:

Twelfth Annual Warren K. Sinclair Keynote Address

Influence of NCRP on Radiation Protection in the United States: Guidance and Regulation,
Kenneth R. Kase

Basic Standards

Evolution of the Radiation Protection System and Its Implementation, Edward Lazo
Federal Directions in Radiation Regulations: Making the “Old” New Again, Jonathan D. Edwards

Source Security

Enhanced Radioactive Material Source Security, Joseph Klinger
End of Life Decisions for Sealed Radioactive Sources, Kathryn H. Pryor

Waste Disposal

Factors Important to Effective Long-Term Management Strategies for Depleted Uranium Disposal,
Michael T. Ryan
Management of Used Fuel and the Nuclear Fuel Cycle, Peter B. Lyons, John W. Herczeg

Medical

Revision of Suggested State Regulations, John P. Winston
NCRP Guidance for Lens of the Eye, Lawrence T. Dauer

Thirty-Ninth Lauriston S. Taylor Lecture on Radiation Protection and Measurements

Dosimetry of Internal Emitters: Contributions of Radiation Protection Bodies and Radiological
Events, Keith F. Eckerman

First Thomas S. Tenforde Topical Lecture

Ethics and Radiation Protection, Jacques Lochard

Emergency Preparedness

Update of ICRP Publications 109 and 111, Michiaki Kai
Updated Dosimetry in the New Protective Action Guides Manual, Sara DeCair
National Alliance for Radiation Readiness: Leveraging Partnerships to Increase Preparedness,
James S. Blumenstock

Summary

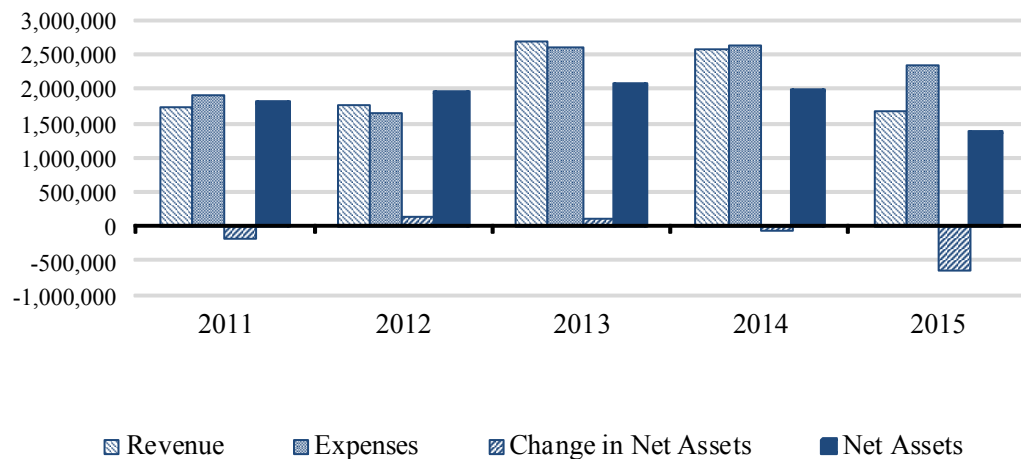
Donald A. Cool

Serving on the Program Committee for the 2015 Annual Meeting were: *Chairman*, Donald A. Cool; *Co-Chairs*, Ruth E. McBurney and Kathryn H. Pryor; and Committee members, Isaf Al-Nabulsi, Armin Ansari, Renate Czarwinski, Jonathan D. Edwards, John A. MacKinney, Donald L. Miller, Michael A. Noska; and *Consultant*, Michael T. Ryan. The proceedings of the 2015 Annual Meeting will be published in *Health Physics*.

Financial Summary

The table and bar graph presented below exhibit NCRP’s year-end financial data for 2015 and the four preceding years in the categories: (1) total revenue from grants, contracts, contributions, corporate sponsorships, contributed professional services, administrative services, sales of publications, and investments; (2) total operating and investment expenses; (3) change in net assets of the corporation; and (4) net assets.

Year	Revenue	Expenses	Change in Net Assets	Net Assets
2011	1,725,326	1,916,162	(190,836)	1,814,328
2012	1,776,001	1,638,754	137,247	1,951,574
2013	2,706,268	2,595,346	110,922	2,062,496
2014	2,578,042	2,642,904	(64,862)	1,997,634
2015	1,685,080	2,344,155	(627,770)	1,363,807



Appendix 1. Finances

Exhibit A Statement of Financial Position For the year ended December 31, 2015 (unaudited)

Current Assets

Cash and cash equivalents	\$ 56,402
Investments [at market]	1,545,836
Accounts receivable:	
Publications	3,733
Grants and contracts	144,111
International Commission on Radiation Units and Measurements	1,049
Inventory—publications	302,416
Prepaid expenses and other assets	16,313
Total current assets	<u>2,069,860</u>

Property and Equipment [at cost]

Furniture and equipment	173,872
Less accumulated depreciation	161,959
Total property and equipment	<u>11,913</u>

TOTAL ASSETS \$ 2,081,773

Liabilities

Line of credit	\$ 355,000
Accounts payable and accrued expenses	209,241
Total current liabilities	<u>564,241</u>

Other Liabilities

Deferred rent liability	1,219
Accrued post-retirement benefits	152,506
Total other liabilities	<u>153,725</u>
TOTAL LIABILITIES	<u><u>717,966</u></u>



Net Assets	
Unrestricted:	
Undesignated	(205,394)
Board designated	1,322,779
Temporarily restricted	211,422
Permanently restricted	35,000
TOTAL NET ASSETS	<u>1,363,807</u>
TOTAL LIABILITIES AND NET ASSETS	<u><u>\$ 2,081,773</u></u>

Exhibit B Statement of Activities For the year ended December 31, 2015 (unaudited)

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Revenue and Other Increases				
Contracts and grants	\$ 1,149,955	\$ —	\$ —	\$ 1,149,955
Contributions	116,161	—	—	116,161
Corporate sponsorship	25,000	—	—	25,000
Contributed professional services	254,100	—	—	254,100
Sales of publications	144,932	—	—	144,932
Dividends and interest	68,393	9,285	—	77,678
Net realized and unrealized gain on investments	(90,179)	(14,911)	—	(105,090)
Professional and administrative services	22,344	—	—	22,344
Total revenue and other increases	1,690,706	(5,626)	—	1,685,080
Expenses and other decreases				
Program costs:				
Contracts and grants	984,102	—	—	984,102
Publications	73,495	—	—	73,495
Contributed professional services	254,100	—	—	254,100
Total program costs	1,311,697	—	—	1,311,697
Management and general expenses	1,032,458	—	—	1,032,458
Total expenses	2,344,155	—	—	2,344,155
Investment fees	15,110	1,886	—	16,996
Post-retirement benefit change	(48,301)	—	—	(48,301)
	2,310,964	1,886	—	2,312,850
Change in Net Assets	(620,258)	(7,512)	—	(627,770)
Net Assets at Beginning of Year	1,737,643	218,934	35,000	1,991,577
Net Assets at End of Year	\$ 1,117,385	\$ 211,422	\$ 35,000	\$ 1,363,807

Exhibit C
Statement of Cash Flow
For the year ended December 31, 2015
(unaudited)

Cash flows from operating activities:	
Change in net assets	\$ (627,770)
Adjustments to reconcile change in net assets to cash provided by operating activities	
Depreciation	11,433
Net realized and unrealized loss on investments	105,090
(Increase) decrease in assets:	
Accounts receivable	76,992
Inventory—publications	2,831
Prepaid expenses and other assets	135
Increase (decrease) in liabilities:	
Accounts payable and accrued expenses	(61,351)
Deferred rent liability	(4,484)
Accrued post-retirement benefits	(41,203)
Net cash used by operating activities	<u>(538,327)</u>
Cash flows from investing activities:	
Purchase of equipment	(500)
Purchase of investments	(120,712)
Sale of investments	302,190
Net cash provided by investing activities	<u>180,978</u>
Cash flows from financing activities:	
Net borrowings on line of credit	265,000
Net decrease in cash and cash equivalents	<u>(92,349)</u>
Cash and cash equivalents at beginning of year	<u>148,751</u>
Cash and cash equivalents at end of year	<u>\$ 56,402</u>

Schedule 1 Schedule of Contracts and Grants Revenue For the year ended December 31, 2015

(unaudited)

Contracts

Defense Threat Reduction Agency	\$ 1,422
U.S. Department of Homeland Security	125,170
Total contracts	126,592

Grants

Centers for Disease Control and Prevention	139,941
National Aeronautics and Space Administration	143,401
U.S. Department of Energy	397,122
U.S. Nuclear Regulatory Commission	342,899
Total grants	1,023,363

Total contracts and grants revenue	\$ 1,149,955
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Schedule 2

Schedule of Contributions & Corporate Sponsorship Revenue

For the year ended December 31, 2015

(unaudited)

Contributions

American Academy of Health Physics	\$ 1,000
American Association of Physicists in Medicine	5,400
American College of Radiology Foundation	25,000
American Osteopathic College of Radiology	275
American Registry of Radiologic Technologists	6,000
American Roentgen Ray Society	15,000
American Society of Radiologic Technologists	6,000
Conference of Radiation Control Program Directors, Inc.	3,000
Council on Radionuclides and Radiopharmaceuticals	2,000
Health Physics Society	12,000
Individuals	6,486
Landauer, Inc.	3,000
LSU Health Foundation	3,000
Radiological Society of North America	25,000
Society of Nuclear Medicine and Molecular Imaging*	2,500
Society of Pediatric Radiology*	500

Total contributions	\$ 116,161
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Corporate Sponsors

3M	\$ 5,000
Landauer, Inc.	10,000
Nuclear Energy Institute	10,000

Total Corporate Sponsors	\$ 25,000
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*Contribution pledged in 2015 but received in January 2016.

Appendix 2. Publications

Distribution of NCRP Publications

(during the period May 16, 1931 through December 31, 2015)

No.	Title and Year of Publication	Government Printing Office ^a	Number of Copies Distributed			
			NCRP Publications ^b		Total NCRP Publications	All Sources Combined
			2015			
		Hardcopy	E-Pub			
NCRP Reports						
175	Decision Making for Late-Phase Recovery from Major Nuclear or Radiological Incidents (2014)	__d	162	94	256	256
174	Preconception and Prenatal Radiation Exposure: Health Effects and Protective Guidance (2013)	__d	25	14	363	363
173	Investigation of Radiological Incidents (2012)	__d	15	12	283	283
172	Reference Levels and Achievable Doses in Medical and Dental Imaging: Recommendations for the United States (2012)	__d	22	41	606	606
171	Uncertainties in the Estimation of Radiation Risks and Probability of Disease Causation (2012)	__d	10	9	305	305
170	Second Primary Cancers and Cardiovascular Disease After Radiation Therapy (2011)	__d	6	6	256	256
169	Design of Effective Radiological Effluent Monitoring and Environmental Surveillance Programs (2010)	__d	6	3	229	229
168	Radiation Dose Management for Fluoroscopically-Guided Interventional Medical Procedures (2010)	__d	22	15	814	814
167	Potential Impact of Genetic Susceptibility and Previous Radiation Exposure on Radiation Risk for Astronauts (2010)	__d	5	4	175	175
166	Population Monitoring and Radionuclide Decorporation Following a Radiological or Nuclear Incident (2010)	__d	18	8	357	357
165	Responding to a Radiological or Nuclear Terrorism Incident: A Guide for Decision Makers (2010)	__d	18	13	949	949
164	Uncertainties in Internal Radiation Dosimetry (2009)	__d	0	5	189	189
163	Radiation Dose Reconstruction: Principles and Practices (2009)	__d	4	3	370	370
162	Self Assessment of Radiation-Safety Programs (2009)	__d	3	11	564	564

No.	Title and Year of Publication	Number of Copies Distributed				
		Government Printing Office ^a	NCRP Publications ^b		Total NCRP Publications	All Sources Combined
			2015			
			Hardcopy	E-Pub		
161	Management of Persons Contaminated with Radionuclides (2009)	__d	16	38	1,336	1,336
160	Ionizing Radiation Exposure of the Population of the United States (2009)	__d	67	27	1,729	1,729
159	Risk to the Thyroid from Ionizing Radiation (2008)	__d	4	3	300	300
158	Uncertainties in the Measurement and Dosimetry of External Radiation (2007)	__d	1	4	723	723
157	Radiation Protection in Educational Institutions (2007)	__d	3	3	872	872
156	Development of a Biokinetic Model for Radionuclide-Contaminated Wounds and Procedures for Their Assessment, Dosimetry and Treatment (2006)	__d	6	5	801	801
155	Management of Radionuclide Therapy Patients (2006)	__d	10	19	1,192	1,192
154	Cesium-137 in the Environment: Radioecology and Approaches to Assessment and Management (2006)	__d	1	1	597	597
153	Information Needed to Make Radiation Protection Recommendations for Space Missions Beyond Low-Earth Orbit (2006)	__d	1	2	725	725
152	Performance Assessment of Near-Surface Facilities for Disposal of Low-Level Radioactive Waste (2005)	__d	1	4	590	590
151	Structural Shielding Design and Evaluation for Megavoltage X- and Gamma-Ray Radiotherapy Facilities (2005)	__d	30	34	3,633	3,633
150	Extrapolation of Radiation-Induced Cancer Risks from Nonhuman Experimental Systems to Humans (2005)	__d	1	1	724	724
149	A Guide to Mammography and Other Breast Imaging Procedures (2004)	__d	3	3	1,178	1,178
148	Radiation Protection in Veterinary Medicine (2004)	__d	8	19	1,268	1,268
147	Structural Shielding Design for Medical X-Ray Imaging Facilities (2004)	__d	34	56	4,568	4,568
	Compact disk version of Report No. 147	__d	0	0	143	143
146	Approaches to Risk Management in Remediation of Radioactively Contaminated Sites (2004)	__d	1	2	1,115	1,115
145	Radiation Protection in Dentistry (2003)	__d	17	39	2,421	2,421
144	Radiation Protection for Particle Accelerator Facilities (2003)	__d	6	20	2,266	2,266
143	Management Techniques for Laboratories and Other Small Institutional Generators to Minimize Off-Site Disposal of Low-Level Radioactive Waste (2003)	__d	0	4	738	738

No.	Title and Year of Publication	Number of Copies Distributed				
		Government Printing Office ^a	NCRP Publications ^b		Total NCRP Publications	All Sources Combined
			2015			
			Hardcopy	E-Pub		
142	Operational Radiation Safety Program for Astronauts in Low-Earth Orbit: A Basic Framework (2002)	__d	1	4	1,163	1,163
141	Managing Potentially Radioactive Scrap Metal (2002)	__d	0	1	1,246	1,246
140	Exposure Criteria for Medical Diagnostic Ultrasound: II. Criteria Based on All Known Mechanisms (2002)	__d	1	3	826	826
139	Risk-Based Classification of Radioactive and Hazardous Chemical Wastes (2002)	__d	0	6	1,001	1,001
138	Management of Terrorist Events Involving Radioactive Material (2001)	__d	1	4	7,611	7,611
137	Fluence-Based and Microdosimetric Event-Based Methods for Radiation Protection in Space (2001)	__d	0	0	781	781
136	Evaluation of the Linear-Nonthreshold Dose-Response Model for Ionizing Radiation (2001)	__d	1	6	1,400	1,400
135	Liver Cancer Risk from Internally-Deposited Radionuclides (2001)	__d	0	0	1,120	1,120
134	Operational Radiation Safety Training (2000)	__d	3	6	1,366	1,366
133	Radiation Protection for Procedures Performed Outside the Radiology Department (2000)	__d	2	7	1,724	1,724
132	Radiation Protection Guidance for Activities in Low-Earth Orbit (2000)	__d	2	6	1,051	1,051
131	Scientific Basis for Evaluating the Risks to Populations from Space Applications of Plutonium (2001)	__d	0	0	803	803
130	Biological Effects and Exposure Limits for “Hot Particles” (1999)	__d	0	2	1,145	1,145
129	Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies (1999)	__d	1	5	1,696	1,696
128	Radionuclide Exposure of the Embryo/Fetus (1998)	__d	4	4	1,617	1,617
127	Operational Radiation Safety Program (1998)	__d	16	7	2,454	2,454
126	Uncertainties in Fatal Cancer Risk Estimates Used in Radiation Protection (1997)	__d	0	4	1,900	1,900
125	Deposition, Retention and Dosimetry of Inhaled Radioactive Substances (1997)	__d	1	3	2,570	2,570
124	Sources and Magnitude of Occupational and Public Exposures from Nuclear Medicine Procedures (1996)	__d	2	6	3,211	3,211
123	Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Ground (1996)	__d	4	19	3,227	3,227

No.	Title and Year of Publication	Number of Copies Distributed				
		Government Printing Office ^a	NCRP Publications ^b		Total NCRP Publications	All Sources Combined
			2015			
			Hardcopy	E-Pub		
122	Use of Personal Monitors to Estimate Effective Dose Equivalent and Effective Dose to Workers for External Exposure to Low-LET Radiation (1995)	__d	8	6	3,372	3,372
121	Principles and Application of Collective Dose in Radiation Protection (1995)	__d	0	1	2,470	2,470
120	Dose Control at Nuclear Power Plants (1994)	__d	0	1	3,008	3,008
119	A Practical Guide to the Determination of Human Exposure to Radiofrequency Fields (1993)	__d	1	10	3,527	3,527
118	Radiation Protection in the Mineral Extraction Industry (1993)	__d	1	0	2,646	2,646
117	Research Needs for Radiation Protection (1993)	__d	1	0	1,957	1,957
116	Limitation of Exposure to Ionizing Radiation (1993)	__d	14	21	7,329	7,329
115	Risk Estimates for Radiation Protection (1993)	__d	1	2	3,190	3,190
114	Maintaining Radiation Protection Records (1992)	__d	0	2	2,471	2,471
113	Exposure Criteria for Medical Diagnostic Ultrasound: I. Criteria Based on Thermal Mechanisms (1992)	__d	0	0	3,287	3,287
112	Calibration of Survey Instruments Used in Radiation Protection for the Assessment of Ionizing Radiation Fields and Radioactive Surface Contamination (1991)	__d	2	6	3,860	3,860
111	Developing Radiation Emergency Plans for Academic, Medical and Industrial Facilities (1991)	__d	0	5	4,087	4,087
110	Some Aspects of Strontium Radiobiology (1991)	__d	0	0	2,568	2,568
109	Effects of Ionizing Radiation on Aquatic Organisms (1991)	__d	0	2	2,211	2,211
108	Conceptual Basis for Calculations of Absorbed-Dose Distributions (1991)	__d	0	0	3,139	3,139
107	Implementation of the Principle of As Low As Reasonably Achievable (ALARA) for Medical and Dental Personnel (1990)	__d	0	7	3,403	3,403
106	Limit for Exposure to "Hot Particles" on the Skin (1990)	__d	1	1	2,888	2,888
105	Radiation Protection for Medical and Allied Health Personnel (1989)	__d	1	7	6,840	6,840
104	The Relative Biological Effectiveness of Radiations of Different Quality (1990)	__d	0	1	2,418	2,418
103	Control of Radon in Houses (1989)	__d	0	0	3,767	3,767
102	Medical X-Ray, Electron Beam and Gamma-Ray Protection for Energies up to 50 MeV (Equipment Design, Performance and Use) (1989)	__d	3	9	7,830	7,830
101	Exposure of the U.S. Population from Occupational Radiation (1989)	__d	0	1	4,164	4,164

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99	Quality Assurance for Diagnostic Imaging (1988)	__d	5	5	4,868	4,868
98	Guidance on Radiation Received in Space Activities (1989)	__d	0	0	3,405	3,405
97	Measurement of Radon and Radon Daughters in Air (1988)	__d	0	0	4,248	4,248
96	Comparative Carcinogenicity of Ionizing Radiation and Chemicals (1989)	__d	0	1	4,097	4,097
95	Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources (1987)	__d	1	5	4,285	4,285
94	Exposure of the Population in the United States and Canada from Natural Background Radiation (1987)	__d	0	4	4,433	4,433
93	Ionizing Radiation Exposure of the Population of the United States (1987)	__d	0	3	7,392	7,392
92	Public Radiation Exposure from Nuclear Power Generation in the United States (1987)	__d	0	0	3,690	3,690
91	Recommendations on Limits for Exposure to Ionizing Radiation (1987)	__d	0	0	8,486	8,486
90	Neptunium: Radiation Protection Guidelines (1988)	__d	0	1	2,908	2,908
89	Genetic Effects from Internally Deposited Radionuclides (1987)	__d	0	0	3,967	3,967
88	Radiation Alarms and Access Control Systems (1986)	__d	0	1	4,814	4,814
87	Use of Bioassay Procedures for Assessment of Internal Radionuclide Deposition (1987)	__d	2	2	4,261	4,261
86	Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields (1986)	__d	0	5	5,309	5,309
85	Mammography—A User's Guide (1986)	__d	0	0	32,655	32,655
84	General Concepts for the Dosimetry of Internally Deposited Radionuclides (1985)	__d	0	3	4,261	4,261
83	The Experimental Basis for Absorbed-Dose Calculations in Medical Uses of Radionuclides (1985)	__d	0	0	3,551	3,551
82	SI Units in Radiation Protection and Measurements (1985)	__d	0	2	4,589	4,589
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80	Induction of Thyroid Cancer by Ionizing Radiation (1985)	__d	0	0	4,271	4,271
79	Neutron Contamination from Medical Electron Accelerators (1984)	__d	3	3	4,845	4,845
78	Evaluation of Occupational and Environmental Exposures to Radon and Radon Daughters in the United States (1984)	__d	0	0	6,479	6,479

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76	Radiological Assessment: Predicting the Transport, Bioaccumulation, and Uptake by Man of Radionuclides Released to the Environment (1984)	__d	1	2	6,691	6,691
75	Iodine-129: Evaluation of Release from Nuclear Power Generation (1983)	__d	0	0	5,948	5,948
74	Biological Effects of Ultrasound: Mechanisms and Clinical Implications (1983)	__d	0	0	11,227	11,227
73	Protection in Nuclear Medicine and Ultrasound Diagnostic Procedures in Children (1983)	__d	0	1	5,503	5,503
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71	Operational Radiation Safety—Training (1983)	__d	0	0	5,074	5,074
70	Nuclear Medicine—Factors Influencing the Choice and Use of Radionuclides in Diagnosis and Therapy (1982)	__d	0	1	5,417	5,417
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65	Management of Persons Accidentally Contaminated with Radionuclides (1980)	__d	1	4	18,446	18,446
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53	Review of NCRP Radiation Dose Limit for Embryo and Fetus in Occupationally Exposed Women (1977)	__d	__e	0	9,289	9,289
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51	Radiation Protection Design Guidelines for 0.1-100 MeV Particle Accelerator Facilities (1977)	__d	0	0	8,513	8,513
50	Environmental Radiation Measurements (1976)	__d	0	2	7,927	7,927
49	Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies up to 10 MeV (1976)	__d	0	17	17,699	17,699
	Adjunct to NCRP Report 49 (1976)	__d	0	0	2,797	2,797
48	Radiation Protection for Medical and Allied Health Personnel (1976)	__d	__e	0	14,359	14,359
47	Tritium Measurement Techniques (1976)	__d	1	5	6,392	6,392
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42	Radiological Factors Affecting Decision-Making in a Nuclear Attack (1974)	__d	0	3	47,247	47,247
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40	Protection Against Radiation from Brachytherapy Sources (1972)	__d	0	6	9,808	9,808
39	Basic Radiation Protection Criteria (1971)	__d	__e	0	40,393	40,393
38	Protection Against Neutron Radiation (1971)	__d	3	2	8,991	8,991
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35	Dental X-Ray Protection (1970)	__d	0	0	28,559	28,559
34	Medical X-Ray and Gamma-Ray Protection for Energies up to 10 MeV—Structural Shielding Design and Evaluation (1970)	__d	__e	0	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	0	98,134	98,134
32	Radiation Protection in Educational Institutions (1966)	__d	0	0	22,362	22,362
31	Shielding for High Energy Electron Accelerator Installations (1964)	3,700	__e	0	2,697	6,397
30	Safe Handling of Radioactive Materials (1964)	24,450	4	0	9,952	34,402
29	Exposure to Radiation in an Emergency	55,705	__e	0	3,678	59,383
28	A Manual of Radioactivity Procedures (1961)	22,892	__e	0	3,665	26,557
27	Stopping Powers for Use with Cavity Chambers (1961)	4,144	4	0	3,835	7,979
26	Medical X-Ray Protection up to Three Million Volts (1961)	75,894	__e	0	27,154	103,048
25	Measurement of Absorbed Dose of Neutrons and Mixtures of Neutrons and Gamma Rays (1961)	10,790	0	0	4,083	14,873
24	Protection Against Radiations from Sealed Gamma Sources (1960)	35,710	__e	0	953	36,663
23	Measurement of Neutron Flux and Spectra for Physical and Biological Applications (1960)	11,849	0	0	3,073	14,922
22	Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure (1959)	52,526	2	0	7,448	59,974
21	Safe Handling of Bodies Containing Radioactive Isotopes (1958)	29,304	__e	0	2,352	31,656
20	Protection Against Neutron Radiation up to 30 Million Electron Volts (1957)	16,989	__e	0	353	17,342
19	Regulation of Radiation Exposure by Legislative Means (1955)	15,140	__e	0	0	15,140
18	X-Ray Protection (1955)	98,713	__e	0	0	98,713
17	Permissible Dose from External Sources of Ionizing Radiation (1954)	60,530	__e	0	2,038	62,568
16	Radioactive Waste Disposal in the Ocean (1954)	16,203	__e	0	2,664	18,867
15	Safe Handling of Cadavers Containing Radioactive Isotopes (1953)	14,486	__e	0	0	14,486
14	Protection Against Betatron-Synchrotron Radiations up to 100 Million Electron Volts (1954)	27,190	__e	0	1,710	28,900

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12	Recommendations for the Disposal of Carbon-14 Wastes (1953)	23,506	__e	0	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	0	0	32,494
10	Radiological Monitoring Methods and Instruments (1952)	59,651	__e	0	3,894	63,545
9	Recommendations for Waste Disposal of Phosphorus-32 and Iodine-131 for Medical Users (1951)	28,810	__e	0	5,682	34,492
8	Control and Removal of Radioactive Contamination in Laboratories (1951)	50,500	4	0	7,657	58,157
7	Safe Handling of Radioactive Isotopes (1949)	60,867	__e	0	0	60,867
6	Medical X-Ray Protection up to Two Million Volts (1949)	70,261	__e	0	0	70,261
5	Safe Handling of Radioactive Luminous Compounds (1941)	6,187	__e	0	0	6,187
4	Radium Protection (1938)	10,086	__e	0	0	10,086
3	X-Ray Protection (1936)	16,490	__e	0	0	16,490
2	Radium Protection (1934)	__g	__e	0	0	0
1	X-Ray Protection (1931)	1,596	__e	0	0	1,596
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Lauriston S. Taylor Lectures

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36	From the Field to the Laboratory and Back: The <i>What Ifs</i> , <i>Wows</i> , and <i>Who Cares</i> of Radiation Biology, Antone L. Brooks (2012), <i>Health Phys.</i> 105 (5), 407–421	__i	__i	__i	__i
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34	Radiation Protection and Public Policy in an Uncertain World, Charles E. Land (2010), <i>Health Phys.</i> 101 (5), 497–629 (2011)	__i	__i	__i	__i
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6	Ethics, Trade-Offs and Medical Radiation, by Eugene L. Saenger (1982)	__d	1	0	1,251	1,251
5	How Well Can We Assess Genetic Risk? Not Very, by James F. Crow (1981)	__d	0	0	1,404	1,404
4	From “Quantity of Radiation” and “Dose” to “Exposure” and “Absorbed Dose”—An Historical Review, by Harold O. Wyckoff (1980)	__d	0	0	1,852	1,852
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NCRP Annual Meeting Proceedings

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34	Emerging Issues in Radiation Protection in Medicine, Emergency Response, and the Nuclear Fuel Cycle, Proceedings of the Forty-Eighth Annual Meeting held March 12–13, 2012. Health Phys. 105 (5), 401–468 (2013)	__i	__i	__i	__i	
33	Scientific and Policy Challenges of Particle Radiations in Medical Therapy and Space Missions, Proceedings of the Forty-Seventh Annual Meeting held March 78, 2011. Health Phys. 103 (5), 529–684 (2012)	__i	__i	__i	__i	
32	Communication of Radiation Benefits and Risks in Decision Making, Proceedings of the Forty-Sixth Annual Meeting held March 8–9, 2010. Health Phys. 101 (5), 497–629 (2011)	__i	__i	__i	__i	
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	Compact disk version of Proceedings No. 26	__i	0	0	102 102	
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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	0	__j	748	748
8	Nonionizing Electromagnetic Radiations and Ultrasound, Proceedings of the Twenty-Second Annual Meeting held April 2–3, 1986 (1988)	__d	0	__j	1,025	1,025
7	Radioactive Waste, Proceedings of the Twenty-First Annual Meeting held April 3–4, 1985 (1986)	__d	0	__j	1,421	1,421
6	Some Issues Important in Developing Basic Radiation Protection Recommendations, Proceedings of the Twentieth Annual Meeting held April 4–5, 1984 (1985)	__d	0	__j	1,537	1,537
5	Environmental Radioactivity, Proceedings of the Nineteenth Annual Meeting held April 6–7, 1983 (1984)	__d	0	__j	3,976	3,976
4	Radiation Protection and New Medical Diagnostic Approaches, Proceedings of the Eighteenth Annual Meeting held April 6–7, 1982 (1983)	__d	0	__j	1,210	1,210
3	Critical Issues in Setting Radiation Dose Limits, Proceedings of the Seventeenth Annual Meeting held April 8–9, 1981 (1982)	__d	0	__j	1,667	1,667
2	Quantitative Risk in Standards Setting, Proceedings of the Sixteenth Annual Meeting held April 2–3, 1980 (1981)	__d	__e	__j	2,158	2,158
1	Perceptions of Risk, Proceedings of the Fifteenth Annual Meeting held March 14–15, 1979 (1980)	__d	0	__j	1,944	1,944
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