Annual Report

2022

Year in Review

NCRP

Contents

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.

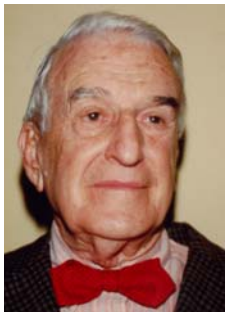
Participants in the Council's work are the Council members and members of scientific, advisory and administrative committees. Council members are selected on the basis of their scientific expertise and serve as individuals, not as representatives of any particular organization. The scientific committees, 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.

NCRP

Mission

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

Presidents



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 –2018

Kathryn D. Held
2019 –

NCRP

President's Message

As I write this message, the NCRP staff are working hard to finalize logistical arrangements for the 2023 Annual Meeting, to be held in person in Bethesda in late March. The Program Committee has organized a wonderful, informative meeting on "Integration of Physics, Biology and Epidemiology in Radiation Risk Assessment" (more below), and we are all eager to see everyone at our first in-person meeting since 2019.

NCRP continues to face challenges as well as have significant accomplishments. After the COVID-mediated unique years of 2020 and 2021, we started to get somewhat back to "normal" in the second half of 2022. We have had a few NCRP committee meetings in person, but everyone has become accustomed to virtual meetings, and there can be significant time and financial savings associated with those. I expect that, going forward, we will have virtual meetings of most scientific and administrative committees that are unfunded or have limited funding, with rarer in-person meetings, as needed. Our scientific committees (SCs) that have funding for in-person meetings can get back to having some in-person meetings, which can be important to further work of the SCs as well as help our finances.

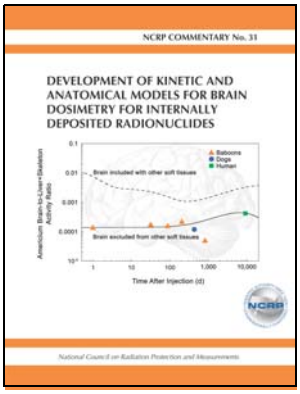
Highlights of 2022:

- An important change this year was the move of our NCRP office in late October from Suite 400 to Suite 905 in the Landow Building. Many thanks go to Laura Atwell, Myrna Young, and Beverly Ottman, our ever-dependable office staff, for the tremendous job they did planning and implementing the move and challenging downsizing. The new space is lovely and efficient. We decreased our office space by about 35 % and the rent by about 45 %, for a savings of about $5,500/month, backdated to July. The move itself cost us about $12,000, so we realized a nice savings in 2022 and will do even better in 2023, important given the tight budget.
- As always, a high point of the NCRP year was the highly successful Annual Meeting held virtually in late March 2022. Due to the hard work of Jessica S. Wieder and Evagelia C. Laiakis, Program Co-Chairs, and their Program Committee, the well-attended meeting (about 350 registrants) had cutting-edge presentations on "Opportunities in Radiation Science: From Low Dose to Climate Change," and the online access for all went smoothly thanks to A Meeting By Design (AMBD), who handled the IT side of the meeting. It was a really outstanding meeting, and many thanks go to all involved in its planning and conduct.
- One of the major goals I had when I became NCRP President was to decrease the backlog of publications from SCs that existed at that time. That backlog now is largely gone, with only one of the currently existing SCs having started before I became President. The hard work of all the Council and committee members, especially the chairs of the relevant SCs, is greatly appreciated.
- We received new funding in 2022 from the American Board of Radiology (ABR) Foundation, to support SC 4-13, and we had continuing funding from numerous federal agencies and other organizations to support the various committees of NCRP and the Million Person Study (MPS). These include (in alphabetical order) the Centers for Disease Control and Prevention (CDC), Conference of Radiation Control Program Directors (CRCPD), U.S. Department of Energy (DOE), Food and Drug Administration (FDA), National Aeronautics and Space Administration (NASA), and the U.S. Navy (more info on funding below).

- One NCRP report, two commentaries, and two statements were published in 2022. Descriptions of those NCRP publications are further down in this Message. In addition, eight published papers described work of NCRP or the MPS, and a special issue of the ***International Journal of Radiation Biology*** on the MPS contained 24 papers. At least 23 presentations about the work of NCRP, including MPS efforts funded through NCRP, were made at various venues by NCRP officers, chairs/members of program area committees (PACs) and SCs and others involved in the projects. In all, it has been a highly productive year.
- We currently have nine active committees, including two new SCs and a task group (TG) that were initiated in 2022 (fuller descriptions below):
  - SC 1-28, "Recommendations on Statistical Approaches to Account for Dose Uncertainties in Radiation Epidemiologic Risk Models" (Co-Chairs: Jonine L. Bernstein and Harry M. Cullings), to prepare a commentary.
  - SC 4-13, "Patient Shielding in Medical Imaging" (Chair: Rebecca Milman), to prepare a commentary.
  - TG 4-9 "Task Group for Medical Exposure Assessment in the U.S. Patient Population" (Chair: Jennifer G. Elee), joint with CRCPD.
- In May 2021, we held the first Welcome Webinar for new Council Members, and we repeated that successful endeavor in May 2022. Since we didn't have an in-person annual meeting either year, this was a time to welcome our newly-elected members, introduce them to each other and to several senior members of Council, and to explain more about NCRP. We look forward to doing it in person at the 2023 Annual Meeting.
- Another relatively new initiative is internship and mentoring efforts. We are continuing to expand that effort to get more junior radiation professionals involved with NCRP.
- The awardee selected to receive the 3rd John D. Boice Young Investigator Award at the 2023 Annual Meeting is Dr. Michael B. Bellamy, who works at the Memorial Sloan Kettering Cancer Center (more info see: https://ncrponline.org). Congratulations to Michael!

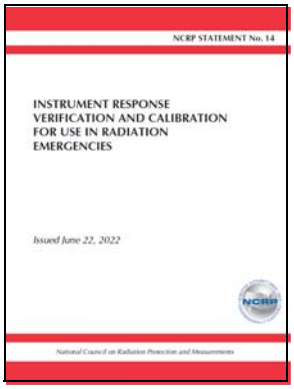
NCRP Publications Completed in 2022:

We are grateful to the members of our SCs who spend many, many hours producing high quality NCRP publications. This year we published the following:



- **NCRP Commentary No. 31, *Development of Kinetic and Anatomical Models for Brain Dosimetry for Internally Deposited Radionuclides***, prepared by SC 6-12 (Chair: Richard W. Leggett; Vice-Chair: Sergei Y. Tolmachev), was published in February 2022. This Commentary, supported by grants from DOE, examines ways to improve current biokinetic and dosimetric modeling of the brain that may result in improved dose estimates for brain tissue from internally deposited radionuclides. The improvements are relevant to radiation protection, ongoing epidemiologic research aimed at evaluating cancer incidence, dementia, Alzheimer's, Parkinson's, and cognitive impairment as possible adverse effects of radionuclide accumulation in the brain, and may also be relevant to possible adverse effects of space radiation in astronauts.
- **NCRP Statement No. 14, *Instrument Response Verification and Calibration for Use in Radiation Emergencies***, prepared by SC 3-2 (Co-Chairs: Gladys A. Klemic and Leticia S. Pibida), was issued in June 2022. Supported by CDC and CRCPD, this Statement provides recommendations for maintaining the readiness of radiation detection equipment for use in a large-scale nuclear or radiological emergency. This will be useful to municipal, county, and state entities having different levels of experience and

focus, including fire services, law enforcement, emergency management, public health agencies, and hospitals.



- **NCRP Report No. 187, *Operational Radiation Safety Program***, prepared by SC 2-8 (Chair: Kathryn H. Pryor) and published in July 2022, provides basic guidance for all aspects of establishing and maintaining radiation safety programs across the spectrum of operational settings. An update of NCRP Report No. 127, the new Report incorporates the latest guidance from 21 NCRP documents published since Report No. 127. The Health Physics Society and American Academy of Health Physics provided partial support for preparation of this Report.
- **NCRP Statement No. 15, *Respiratory Protection Recommendations for Workers and Volunteers Responding to a Nuclear Incident Outside the Affected Area***, prepared by SC 3-3 (Co-Chairs: Armin Ansari and Adela Salame-Alfie), was issued in August 2022. This Statement, the preparation of which was supported by CDC, recommends a tiered approach for respiratory protection of workers and volunteers at public shelters, community reception centers, or other locations who will be providing services after a large-scale nuclear incident and may be at risk of an inhalation or incidental ingestion hazard generated by arrival and movement of potentially contaminated people.
- **NCRP Commentary No. 32, *Evaluation of a Sex-Specific Difference in Lung Cancer Radiation Risk and Approaches for Improving Lung Cancer Radiation Risk Projection (with a Focus on Application to Space Activities)***, prepared by SC 1-27 (Chair: Michael M. Weil; Co-Chair: David J. Pawel), was published in December 2022. Funded by NASA and DOE, this project examines the risk of lung cancer in populations exposed particularly to chronic (protracted or fractionated) radiation. A main objective is to assess whether there is a sex-specific difference in lung cancer risk from chronic radiation exposure to the lungs such as experienced by astronauts during extended space missions.

Committees at Work:

- **SC 1-28, Recommendations on Statistical Approaches to Account for Dose Uncertainties in Radiation Epidemiologic Risk Models** (Co-Chairs: Jonine L. Bernstein and Harry M. Cullings), was established this year with funding from DOE, to review current methods used to incorporate dose uncertainties into dose-response models; hold a workshop to hear from experts about the interpretation

of the results of studies with complex dosimetric assessments and substantial dose uncertainties; and, as a result of discussions held at the workshop and other considerations by the Committee, prepare a commentary covering studies of external and internal exposures and provide guidance relative to both shared and unshared uncertainty in dose calculations and the statistical uncertainties therein.

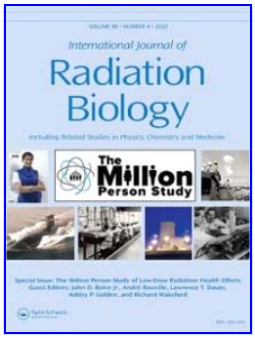
- **SC 4-10, Error Prevention in Radiation Therapy** (Co-Chairs: Steven G. Sutlief and Michael T. Milano), is preparing a statement to provide recommendations for internal and external audits of radiation therapy practices with respect to safety, quality and reliability. The SC had a useful virtual meeting with representatives of stakeholder organizations in January 2022 to get input from professional organizations, regulators, etc.; the statement draft was reviewed by PAC 4 in October and recently by the full Council with final document expected soon. The effort has received funding from CRCPD and FDA.
- **SC 4-12, Risk Management Stratification of Equipment and Training for Fluoroscopy** (Chair: Stephen Balter; Vice Chair: Donald L. Miller), originally was planning to prepare a statement but, given the length and amount of material in the document, it has been decided to make it a commentary. The document will provide guidance that can be used by facilities to select fluoroscopic equipment that conforms to the appropriate International Electrotechnical Commission standard for the facility's intended uses of that particular fluoroscope and to outline a risk-based training program for all individuals privileged to perform or assist with fluoroscopic procedures in a facility. This activity has been supported, in part, by CRCPD. The draft commentary is undergoing Council review.
- **SC 4-13, Patient Shielding in Medical Imaging** (Chair: Rebecca Milman), started work in September. The goal is to prepare a commentary to provide updated recommendations, based on scientific evidence, on the use of patient shielding in medical imaging addressing both in-field and out-of-field shielding for various anatomical sites and tissues (*e.g.*, thyroid, breast, gonads), various imaging examinations (*e.g.*, dental x ray, radiography, mammography, computed tomography, and fluoroscopy), and age- and sex-dependent considerations. The SC is funded, in part, by CDC and the ABR Foundation.
- **SC 6-13, Methods and Models for Estimating Organ Doses from Intakes of Radium** (Chair: Derek W. Jokisch; Vice Chair: Nicole Martinez), is DOE-funded to prepare a commentary describing new and contemporary approaches for obtaining organ doses following intakes of radium. The work will meet several deliverables associated with the MPS. The SC is meeting regularly to prepare a draft document which should be ready for PAC review in the near future.
- **SC 8-1, NCRP Webpages on the Use of Wireless Technology and Evidence on Health Effects** (Chair: David A. Savitz), funded by CDC, is a somewhat new, and exciting, type of activity for NCRP as the goal is to create authoritative, science-based, informational webpages that can serve as a primary resource to which CDC and other federal health agencies can refer members of the public seeking additional information about the use of wireless technology and its known health effects. The Committee has been drafting material, with the aim of having initial webpage information by later this year.
- **TG 4-9, Task Group for Medical Exposure Assessment in the U.S. Patient Population** (Chair: Jennifer G. Elee), is a joint effort with CRCPD (their Task Force H-58) and funded by CDC, to plan follow-up on NCRP Report No. 184, ***Medical Radiation Exposure of Patients in the United States***, prepared by SC 4-9. The group will determine the feasibility of ongoing collection of data and other information on medical exposures, in particular investing in knowledge transfer of the methodology that was used in Report No. 184. A workshop and virtual meeting have been held with more meetings scheduled, with the initial effort being a survey by CRCPD to go to state programs to gain information on data available.

Other Publications:

Chairs and members of NCRP SCs are encouraged to prepare papers for publication in peer-reviewed journals on the work of their SCs; such resulting articles are listed below. Also listed here are other papers related to NCRP work and papers published on the MPS work done through funding to NCRP.

- Leggett RW, Tolmachev SY, Avtandilashvili M, Eckerman KF, Grogan HA, Sgouros G, Woloschak GE, Samuels C, Boice JD Jr. Methods of improving brain dose estimates for internally deposited radionuclides. J Radiol Prot. 42(3):033001, 2022. [PMID 35785774]
- Boice JD Jr, Cohen SS, Mumma MT, Golden AP, Howard S, Girardi DJ, Ellis ED, Bellamy M, Dauer LT, Eckerman KF, Leggett RW. Mortality among Tennessee Eastman Corporation uranium processing workers, 1943-2019. Int J Radiat Biol. 2022 Jun 27:1-21 [Online ahead of print] [PMID 35758985]
- Boice JD Jr, Cohen SS, Mumma MT, Howard SC, Yoder RC, Dauer LT. Mortality among medical radiation workers in the United States, 1965-2016. Int J Radiat Biol. 2022 May 16:1-25 [Online ahead of print] [PMID 34731066]
- Zablotska LB, Richardson DB, Golden A, Pasqual E, Smith B, Rage E, Demers PA, Do M, Fenske N, Deffner V, Kreuzer M, Samet J, Bertke S, Kelly-Reif K, Schubauer-Berigan MK, Tomasek L, Wiggins C, Laurier D, Apostoaei I, Thomas BA, Simon SL, Hoffman FS, Boice JD Jr, Dauer LT, Howard SC, Cohen SS, Mumma MT, Ellis ED, Eckerman KF, Leggett RW, Pawel DJ. The epidemiology of lung cancer following radiation exposure. Int J Radiat Biol. 2022, Aug 22:1-12. Online ahead of print. [PMID 35947399]
- Schöllnberger H, Dauer LT, Wakeford R, Constanzo J, Golden A. Summary of Radiation Research Society Online 67th Annual Meeting, Symposium on "Radiation and Circulatory Effects." Int J Radiat Biol. 2022. Aug 25:1-10 [Online ahead of print] [PMID 35930470]
- Zablotska LB, Zupunski L, Leuraud K, Lopes J, Hinkle J, Pugeda T, Delgado T, Olschowka J, Williams J, O'Banion MK, Boice JD Jr, Cohen SS, Mumma MT, Dauer LT, Britten RA, Stephenson S. Radiation and CNS effects: Summary of evidence from a recent symposium of the Radiation Research Society. Int J Radiol Biol. 2022 Nov 11:1-11. Online ahead of print. [PMID: 36318723]
- Linet MS, Applegate KE, McCollough CH, Bailey JE, Bright C, Bushberg JT, Chanock SJ, Coleman J, Dalal NH, Dauer LT, Davis PB, Eagar RY, Frija G, Held KD, Kachnic LA, Kiess AP, Klein LW, Kosti O, Miller CW, Miller-Thomas MM, Straus C, Vapiwala N, Wieder JS, Yoo DC, Brink JA, Dalrymple JL. A multimedia strategy to integrate introductory broad-based radiation science education in US medical schools. J Am Coll Radiol. 2022 Sep 19:S1546-1440(22)00697-4. Online ahead of print. [PMID 36130692]
- Mahesh M, Ansari AJ, Mettler FA. Patient Exposure from Radiologic and Nuclear Medicine Procedures in the United States and Worldwide: 2009-2018. Radiology 2022; 000:1-9 (online ahead of print).

International Journal of Radiation Biology Special Issue, April 2022 (24 articles on the MPS)



- Boice JD Jr, Bouville A, Dauer LT, Golden AP, Wakeford R. Introduction to the Special Issue on the US Million Person Study of health effects from low-level exposure to radiation. Int J Radiat Biol 98(4):529-532, 2022. [PMID 34612764]
- Boice JD Jr, Cohen SS, Mumma MT, Chen H, Golden AP, Beck HL, Till JE. Mortality among US military participants at eight aboveground nuclear weapons test series. Int J Radiat Biol 98(4):679-700, 2022. [PMID 32602389]
- Boice JD Jr, Cohen SS, Mumma MT, Ellis ED. The Million Person Study, whence it came and why. Int J Radiat Biol. 98(4):537-550, 2022. [PMID 30831042]
- Boice JD Jr, Cohen SS, Mumma MT, Golden AP, Howard SC, Girardi DJ, Dupree Ellis ED, Bellamy M, Dauer LT, Samuels C, Eckerman KF, Leggett RW. Mortality among workers at the Los Alamos National Laboratory, 1943-2017. Int J Radiat Biol 98(4):722-749, 2022. [PMID 34047625]

- Boice JD Jr, Cohen SS, Mumma MT, Hagemeyer DA, Chen H, Golden AP, Yoder RC, Dauer LT. Mortality from leukemia, lung cancer and heart disease among U.S. nuclear power plant workers, 1957-2011. Int J Radiat Biol 98(4):657-678, 2022. [PMID 34669562]
- Boice JD Jr, Ellis ED, Golden AP, Zablotska LB, Mumma MT, Cohen SS. Sex-specific lung cancer risk among radiation workers in the Million Person Study and among TB-fluoroscopy patients. Int J Radiat Biol 98(4):769-780, 2022. [PMID 30614747]
- Boice JD Jr, Quinn B, Ansari A, Blake PK, Blattnig SR, Caffrey EA, Cohen SS, Golden AP, Held KD, Jokisch DW, Leggett RW, Mumma MT, Samuels C, Till JE, Tolmachev SY, Yoder RC, Zhou J, Dauer LT. A million persons, a million dreams: a vision for a National Center for Radiation Epidemiology and Biology. Int J Radiat Biol 98(4):795-821, 2022. [PMID 34669549]
- Boice JD Jr. The Million Person Study relevance to space exploration and Mars. Int J Radiat Biol. 98(4):551-559, 2022. [PMID 30831048]
- Cohen SS, Mumma MT, Ellis ED, Boice JD Jr. Validating the use of census data on education as a measure of socioeconomic status in an occupational cohort. Int J Rad Biol 98(4):587-592, 2022. [PMID 30451561]
- Dauer LT, Bouville A, Toohey RE, Boice JD Jr, Beck HL, Eckerman KF, Hagemeyer D, Leggett RW, Mumma MT, Napier B, Pryor KH, Rosenstein M, Schauer DA, Sherbini S, Stram DO, Thompson JL, Till JE, Yoder RC, Zeitlin C. Dosimetry and uncertainty approaches for the million-worker study of radiation workers and veterans: overview of the recommendations in NCRP Report No. 178. Review. Int J Rad Biol. 98(4):600-609, 2022. [PMID 30452303]
- Dauer LT, Woods M, Miodownik D, Serencsits B, Quinn B, Bellamy M, Yoder C, Liang X, Boice JD Jr, Bernstein J. Cohort profile - MSK radiation workers: a feasibility study to establish a deceased worker sub-cohort as part of a multicenter medical radiation worker component in the Million Person Study of Low-Dose Radiation Health Effects. Int J Radiat Biol 98(4):593-599, 2022. [PMID 30810447]
- Ellis ED, Girardi D, Golden AP, Wallace PW, Phillips J, Cragle DL. Historical perspective on the Department of Energy mortality studies: Focus on the collection and storage of individual worker data. Int J Radiat Biol 98(4):560-567, 2022. [PMID 30495982]
- Golden AP, Cohen SS, Chen H, Ellis ED, Boice JD Jr. Evaluation of statistical modeling approaches for epidemiologic studies of low-dose radiation health effects. Int J Radiat Biol 98(4):572-579, 2022. [PMID 30499762]
- Golden AP, Ellis ED, Cohen SS, Mumma MT, Leggett RW, Wallace PW, Girardi D, Watkins JP, Shore R, Boice JD Jr. Updated mortality analysis of the Mallinckrodt uranium processing workers, 1942-2012. Int J Radiat Biol 98(4):701-721, 2022. [PMID 30652958]
- Hagemeyer D, Nichols G, Mumma MT, Boice JD Jr, Brock TA. 50 years of the Radiation Exposure Information and Reporting System and importance to the Million Person Study. Int J Radiat Biol 98(4):568-571, 2022. [PMID 30359149]
- Leggett RW, Eckerman KF, Bellamy M. MPS dose reconstruction for internal emitters: some site-specific issues and approaches. Int J Radiat Biol 98(4):631-643, 2022. [PMID 30561241]
- Leggett RW, Tolmachev SY, Boice JD Jr. Potential improvements in brain dose estimates for internal emitters. Int J Rad Biol 98(4):644-656, 2022. [PMID 30513240]
- Martinez NE, Jokisch DW, Dauer LT, Eckerman KF, Goans RE, Brockman JD, Tolmachev SY, Avtandilashvili M, Mumma MT, Boice JD Jr, Leggett RW. Radium dial workers: back to the future. Int J Radiat Biol 98(4):750-768, 2022. [PMID 33900890]
- Mumma MT, Cohen SS, Sirko JL, Ellis ED, Boice JD Jr. Obtaining vital status and cause of death on a million persons. Int J Radiat Biol 98(4):580-586, 2022. [PMID 30412007]
- Mumma MT, Sirko JL, Boice JD Jr, Blot WJ. Mesothelioma mortality within two radiation monitored occupational cohorts. Int J Radiat Biol 98(4):786-794, 2022. [PMID 31290725]

- Till J, Beck H, Boice JD Jr, Mohler H, Mumma M, Aanenson J, Grogan H. Asbestos exposure and mesothelioma mortality among atomic veterans, Int J Radiat Biol 98(4):781-785, 2022. [PMID 30513236]
- Till JE, Beck HL, Aanenson JW, Grogan HA, Mohler HJ, Mohler SS, Voillequé PG. Dosimetry associated with veterans who participated in nuclear weapons testing. Int J Radiat Biol 98(4):610-618, 2022. [PMID 30513229]
- Yoder RC, Dauer L, Balter S, Boice JD Jr, Grogan H, Mumma M, Passmore CN, Rothenberg LN, Vetter RJ. Dosimetry for the study of medical radiation workers with a focus on the mean absorbed dose to the lung, brain and other organs. Int J Radiat Biol 98(4):619-630, 2022. [PMID 30451566]

Presentations:

The work of NCRP, including MPS efforts funded through NCRP, is presented at various venues by NCRP officers, chairs/members of PACs and SCs, and others involved in the projects. Presentations in 2022 included:

- Boice JD. "Occupational Radiation, Parkinson's Disease and Cognition." 2022 NASA Human Research Program (HRP) Investigators' Workshop (IWS); Enabling the Future: the Pathway to the Moon and Mars. Virtual Meeting, February 7–10, 2022.
- Held KD. "Radiation Protection in Cancer-Related Research, Treatment and Imaging." Invited Grand Rounds talk for University of Arkansas Medical School Winthrop P Rockefeller Cancer Institute, February 16, 2022.
- Jokisch DW, Martinez NE. "An Overview of the New NCRP Scientific Committee (SC 6-13) on Estimating Organ Doses from Intakes of Radium." 2022 IRPA North American Regional Congress, St. Louis, MO (Hybrid), February 22–24, 2022.
- Salame-Alfie A, Ansari A. "Proposed Recommendations on Respiratory Protection for Emergency Workers Responding to a Nuclear/Radiological Incident." 2022 IRPA North American Regional Congress, St. Louis, MO (Hybrid), February 22–24, 2022.
- Klemic G, Pibida L, Ansari A, Buddemeier B, Irwin W, Iwatschenko-Borho M, Karam PA, Salame-Alfie A, Kouzes R, Daryl F. "NCRP Statement on Instrument Response Verification and Calibration for Use in Radiation Emergencies." 2022 IRPA North American Regional Congress, St. Louis, MO (Hybrid), February 22–24, 2022.
- Held KD. "NCRP Initiatives to Increase Diversity." 2022 IRPA North American Regional Congress, St. Louis, MO (Hybrid), February 22–24, 2022.
- Bushberg JT, "Why It's So Natural for So Many to Believe So Much That Is So Wrong: Communicating Science in a Sea of Misperception and Cognitive Bias." 2022 IRPA North American Regional Congress, St. Louis, MO (Hybrid), February 22–24, 2022.
- Balter S, Miller DL. "Fluoroscopy: Risk Management Stratification of Training and Equipment." 2022 IRPA North American Regional Congress, St. Louis, MO (Hybrid), February 22–24, 2022.
- Martinez NE, Jokisch D, Samuels C, Dauer LT, Boice JD Jr. "Radium dial worker patterns of intake by workplace and era." 2022 IRPA North American Regional Congress; St. Louis, MO (Hybrid), February 22–24, 2022.
- Held KD. "Thoughts from NCRP on the Radiation Sciences Workforce," Invited panel presentation at the Nuclear Regulatory Commission's Regulatory Information Conference (RIC), Bethesda, MD (virtual), March 2022.
- Martinez N, Jokisch D. "Revisiting the Doses to Radium Dial Painters in the United States." Presentation for the BWCHPS virtual monthly meeting, March 24, 2022.
- Ansari A, Salame-Alfie A. "Consideration of a Tiered Approach to Respiratory Protection for Emergency Workers Responding to a Nuclear/Radiological Incident." International Society for Respiratory Protection 20th Conference (ISRP2022), May 9-12, 2022 (virtual).

- Boice JD Jr. “Hearts and Minds — New Frontiers in Radiation Protection?” virtual presentation at the Annual Meeting of the UK Society for Radiological Protection. Llandudno, Wales, June 14, 2022 (virtual).
- Held KD. “Morgan Lecture: New Initiatives in Radiation Protection Sciences.” Invited plenary presentation at Health Physics Society 67th Annual Meeting, Spokane, WA, July 2022.
- Held KD. “NCRP's Views on Radiation Protection Guidance.” Invited talk in AAHP Special Session at Health Physics Society 67th Annual Meeting, Spokane, WA, July 2022.
- Golden A, et al. “Findings from Department of Energy Cohorts in the Million Worker Study: Los Alamos National Laboratory, Rocky Flats Site, and Tennessee Eastman Corporation,” Health Physics Society 67th Annual Meeting, Spokane, WA, July,2022.
- Dauer LT, Boice JD. “The Million Person Study of Low-Level and Low-Dose-Rate Health Effects: Importance, Information and Innovation,” Health Physics Society 67th Annual Meeting, Spokane, WA, July 2022.
- Held KD (for LT Dauer). “Million Worker Study: Innovations in radiation epidemiology and dosimetry,” Oral presentation at the Radiation Research Society 68th Annual Meeting, Hawaii, October 2022.
- Golden A. “Updates from recently published and on-going analyses of Department of Energy cohorts in the US Million Worker Study,” Oral presentation at the Radiation Research Society 68th Annual Meeting, Hawaii, October 2022.
- Milder C. “Epidemiological analysis of historical worker cohorts to estimate excess risk of cardiovascular disease in modern populations: A Million Person Study case study,” Poster presentation at the Radiation Research Society 68th Annual Meeting, Hawaii, October 2022.
- Held KD. “Update on current NCRP initiatives,” Presentation at ISCORS virtual meeting, November 3, 2022.
- Salame-Alfie A. “Respirator guidance for emergency workers & emergency instrument calibration,” Presentation at New England Radiological Health Committee Annual Meeting, Brookhaven National Laboratory, November 18, 2022.
- Dauer L. “Million Person Study,” Presentation for EPRI's International Dose Effect Alliance (IDEA) Workshop, November 30, 2022 (virtual).

I hope that we have captured all the presentations given on behalf of NCRP. I apologize if we've missed any; please let me know about them. We thank all the individuals who have given of their time and effort to represent NCRP so well to a variety of audiences.

Funding Support Summary:

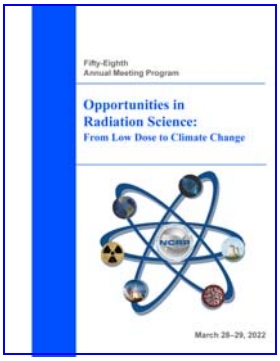
In 2022, NCRP received new funding from the ABR Foundation for SC 4-13 and continued with grants and contracts funded by a number of sources including (active SCs during 2022 supported by each in parentheses):

- CDC (SC 3-2, SC 3-3, SC 4-13, SC 8-1, and TG 4-9)
- CRCPD (SC 3-2, SC 4-10, and SC 4-12)
- DOE (SC 1-27, SC 1-28, SC 6-12, SC 6-13, and MPS)
- FDA (SC 4-10)
- NASA (SC 1-27 and MPS)
- U.S. Navy (MPS)

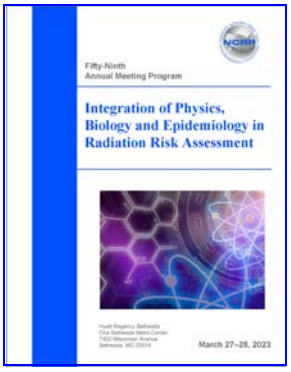
We are grateful for the significant monetary and programmatic support from these federal agencies and other organizations and thank them for their continued interest in and funding of NCRP and our programs. This support is vital to our ability to provide the scientific service to the nation as is NCRP's mission. We

also continue to have discussions with these agencies and organizations and others about other possible opportunities for NCRP to assist them in their missions.

Annual Meetings:



- The **58th NCRP Annual Meeting,** on **"Opportunities in Radiation Science: From Low Dose to Climate Change"** was held virtually March 28-29, 2022. The Program Committee, led by Co-Chairs Jessica S. Wieder and Evagelia C. Laiakis, planned an innovative, interactive meeting to highlight the work of NCRP and its impact and to discuss the future of radiation protection, radiation sciences and NCRP's role and opportunities in that future. A wide range of topics was presented, and it was an honor to have distinguished speakers including the 45th Lauriston Taylor Lecturer, Gayle Woloschak, discussing "Long-Term Radiation Animal Studies: A Story Continues," the 18th Annual Sinclair Keynote Address by Joe W. Gray on "Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States," and the 5th Tenforde Topical Lecture by Jill A. Lipoti on "Opportunities in Radiation Science: Applying Our Collective Knowledge to the Challenges of Our Time." It was a stimulating meeting with a great deal of new information presented.
- The program for the **2023 NCRP Annual Meeting**, which will be held in person in Bethesda on March 27-28, 2023, is all set. The topic is **"Integration of Physics, Biology and Epidemiology in Radiation Risk Assessment,"** and the Program Committee, Chaired by Eric J. Grant with Vice Chair Emily A.Caffrey, has planned a series of cutting-edge talks pointing to an exciting future for radiation protection based on integrating science from a broad realm of disciplines. The theme will be emphasized by the highly regarded speakers including the 46th Lauriston Taylor Lecturer, Martha S. Linet, speaking on "Cancer Risks and Public Health Issues Across the Radiation Frequency Spectrum: The Long and the Short of It," the 19th Annual Sinclair Keynote Address by Michael M. Weil discussing "What do Risk Modelers Want? What Can Biologists Provide?," and the 6th Tenforde Topical Lecture by Susanne M. Rafelski on "Towards Evaluating Cell Damage via Microscopy Imaging and Analysis of Cell Organization." We are looking forward with great anticipation to interacting with all our colleagues and hearing super talks at our first in-person meeting since 2019.



We are in early stages of planning the **2024 Annual Meeting** on **"Advanced Nuclear Power Reactor Technology."** The Program Committee will be chaired by William E. Kennedy, Jr. with co-chairs Willie O. Harris and Kathryn A. Higley. More information to come.

Program Area Committee Work:

The PACs continued to meet virtually in 2022, both around the time of the annual meeting, and some more frequently to discuss PAC business and have scientific presentations and discussions. Several PACs have developed draft proposals that need funding to be moved forward - so many great ideas and needs but such limited resources! We will continue to seek funding sources for these worthy proposals. The PACs are all eagerly planning their in-person meetings for March 2023 at the Annual Meeting. I continue to meet several times a year with the PAC Chairs and find the sessions very helpful as they provide some great ideas for

new activities for NCRP and important insight about ongoings in the radiation community and potential funding discussions. Much of the valuable work done by the PACs involves their oversight of and assistance to NCRP SCs, described above.

Finances:

Our biggest challenge remains the need to build long-term financial stability for the NCRP. There are several items to note with regards to our financial status and efforts:

- As shown in the financial report, we had a small net financial gain in our operations in 2022, but, unfortunately, a significant loss on investments, mirroring changes in the stock market. This resulted in a net decrease in NCRP assets. Being very conservative about federal funding, we currently predict that 2023 will result in a sizable financial loss in operations unless additional income is forthcoming. This predicted loss results from a combination of the decrease in funding from DOE for year five of our ongoing grant from them, the end of the Navy grant in September 2022, and the impending end of the current DOE grant in September 2023. We are in discussions with several funding agencies and other organizations, but it is too early to put potential funding outcomes into budgets. It will continue to be critical for us, in consultation with the Budget and Finance Committee, to monitor finances closely throughout the coming year.
- Not having an in-person annual meeting again in 2022 cut expenses substantially, a decrease we will not have in 2023 since we will have an in-person annual meeting (at a cost of $150,000 to $170,000). For some time, the Board has been discussing the fact that the long-established policy of in-person annual meetings, with little income to off-set those meeting expenses, cannot be sustained. We had implemented a modest registration fee (excluding members, those on the program, and others who felt it was difficult to pay a fee) in 2022; the fee and donations for the meeting brought in about $11,590. As Council Members are aware, we implemented a registration fee for all but speakers for the 2023 meeting and decreased travel reimbursements, but a new mode of operation regarding annual meetings is needed long term.
- The new lease on our office space, with the move to smaller space, saved a net (after moving expenses) of about $20,000 in 2022 and will save more in 2023.
- Because of the decreased expenses due to not having an in-person annual meeting or travel for administrative and other committees, we were able to pay off the loan we have had for some years with Merrill Lynch; our LMA (Loan Management Account) balance is now zero. However, due to stock market fluctuations, the value of our net assets has decreased from the end of 2021 to the end of 2022, and is still well below levels some years back.
- Grants from the ABR Foundation, CDC, CRCPD, DOE, FDA, NASA, and the U.S. Navy have been vital to NCRP's work in recent years. We continue to seek other sources of revenue in this challenging environment, but, at the risk of sounding like a broken record, we need to seek ways to increase funding and secure NCRP's long-term financial position.
- We thank all the Council members and others who have made donations to NCRP directly or took advantage of the AmazonSmile and Give with Bing initiatives, and we encourage you to remember NCRP with a charitable contribution or as a small percentage beneficiary of an IRA or life insurance policy. Your ideas regarding potential fund-raising opportunities are welcome! We acknowledge the Contributors and Corporate Sponsors, who are listed later in this Annual Report. We greatly value their support, both financial and programmatic.

Million Person Study:

A major component of current NCRP activities continues to be the Million Person Study (MPS), which is coordinated through and is a critical source of income for NCRP (grants from DOE, NASA, and the Navy in 2022). NCRP Past President John D. Boice, Jr., who has so ably led and built this vital epidemiology effort for years, continues to direct the effort, as NCRP Director of Science, with substantial leadership also from Lawrence T. Dauer, now MPS Scientific Coordinator. The MPS is designed to study the range of health effects from prolonged radiation exposures in healthy American workers and veterans who are more representative of today's population than are the Japanese atomic-bomb survivors, exposed briefly to radiation in 1945, the population typically used as the epidemiological basis for many evaluations of radiation risk. The MPS will increase scientific understanding that can improve guidelines and guidance to protect workers and members of the public. Major activities of the MPS in 2022 included:

- subgroups working on dosimetry and epidemiology of health effects for various study cohorts continue regular meetings (virtual) as they pursue the project goals and prepare publications on the findings;
- John, Larry and I and numerous others involved in the MPS participated in several workshops of the entire MPS team and subgroups;
- quarterly meetings of John, Larry, other MPS personnel, and I were held (virtually or in person) with the staff of the Naval Dosimetry Center through the Navy grant;
- numerous papers were published related to the MPS in 2022 (listed above) including many in the special issue of the ***International Journal of Radiation Biology***; and
- multiple presentations were given by John, Larry and others (listed above).

Partnerships:

In addition to our valuable partnerships with funding agencies, NCRP continues numerous active and fruitful partnerships with multiple national and international organizations that are listed on the NCRP website. We value review comments from other organizations like the American Association of Physicists in Medicine and American Society for Therapeutic Radiology and Oncology on our draft documents. Additionally, NCRP officers serve on advisory committees and boards and review panels of other groups (*e.g.*, Image Gently, ABR, National Institutes of Health, International Radiation Protection Association); NCRP organizes sessions and provides members to serve as speakers and session chairs at meetings of other entities (*e.g.*, Health Physics Society, Radiation Research Society); and NCRP officers and Board/SC members provide NCRP-related educational activities and material for other organizations (*e.g.*, CDC, NASA, Vanderbilt, Harvard, University of California Davis, University of Maryland). These activities are critical to NCRP's mission and help "spread the word" about NCRP. Don't hesitate to let us know if you can recommend other opportunities for partnerships, formal or informal, and we're always available to give presentations to other groups who are interested in NCRP's work.

Final Thoughts:

NCRP leadership is committed to encouraging more junior professionals in the radiation sciences and more diversity in our SCs, PACs, at our meetings and as Council members. We strive to add diversity to our ranks by engaging qualified junior investigators, women, and minorities. We hope that our new efforts in internships and mentoring will help with that goal and look forward to increasing the efforts. Please encourage your junior and minority colleagues to become involved with NCRP and let us know of talented individuals that we should include in our activities.

It is with great sadness that I report the passing of an Executive Director Emeritus and a Distinguished Emeritus Member in 2022.

W. Roger Ney passed away on August 4, 2022, at the age of 92. Lauriston S. Taylor, NCRP founding president, tapped Mr. Ney to serve as the first Executive Director of NCRP, a position he held from 1964 to 1997.

Mr. Ney was an able leader for NCRP, coordinating the work of contributing scientists at universities around the world, editing the reports, and even learning the challenging art of fundraising. He spent decades of his professional life guiding the NCRP. He was passionate about radiation safety and the promise of radiation as a tool in modern times, and he was passionate about the NCRP.

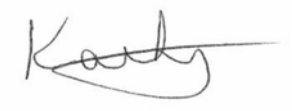
Mr. Ney served with three NCRP Presidents, Lauriston S. Taylor, Warren K. Sinclair, and Charles B. Meinhold. He oversaw the production of over 120 reports, 14 commentaries, and numerous annual meetings and symposia and their published proceedings. He continued to do consulting work for the organization even after he retired.

Marvin Carl Ziskin, M.D. passed away on October 22, 2022, at the age of 86. Dr. Ziskin was born and raised in Philadelphia. He graduated from Temple University Medical School in 1962.

Dr. Ziskin was a member of the National Council on Radiation Protection and Measurements (NCRP) from 1987 to 2005 and was elected a Distinguished Emeritus Member in 2005. He served on the NCRP Board of Directors from 1997 to 2003; member of the NCRP Budget and Finance Committee from 1995 to 1996 and then chair from 1997 to 1999. He also served as a member of PAC 8 and SC 66 which published NCRP Reports No. 74, *Biological Effects of Ultrasound: Mechanisms and Clinical Implications* (1983) and No. 113, *Exposure Criteria for Medical Diagnostic Ultrasound: I. Criteria Based on Thermal Mechanisms* (1992); a Consultant to SC 4-4 on Risks of Ionizing Radiation to the Developing Embryo, Fetus and Nursing Infant; and on the Advisory Panel on Nonionizing Radiation; and was a member of the 1997 Annual Meeting Program Committee.

Following the COVID-19-imposed challenges in 2020, 2021, and early 2022, it was so nice in the later part of 2022 to start to have some NCRP committee meetings back in the office. We all realize that how work is done has changed, and I suspect that NCRP will continue to have many of our committee meetings virtually as we employ the new-found ways to accomplish the NCRP mission and do our jobs. But, as you can see from this narrative, 2022 was a productive year for NCRP. We look forward to another productive year in 2023 and expect that we'll be able to interact in person much more. Despite challenges, there are plentiful opportunities, and it will be wonderful to continue working with all the many terrific scientific and professional colleagues and partnering organizations who work so hard to support NCRP in our mission to serve our great nation.

Many thanks to the hard-working NCRP Staff, Board of Directors, and Council and SC Members for assistance in all NCRP endeavors. Special thanks to Laura Atwell, John Boice, Jerry Bushberg, and Larry Dauer for all they have done for NCRP over many productive years and for their dedication and tireless support and sage advice to me. The strong team that you all make is a joy to be a part of.



Kathryn D. Held
President

Membership

There are up to 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 engineering, nuclear medicine, pathology, physics, public health, public policy, radiation measurements, radiation therapy, radiobiology, radiology, risk analysis and communication, statistics, and waste management. In 2022, six new members were elected, and 13 members were re-elected. The six new members were:

Isaf Al-Nabulsi	James C. Root
Manuela Buonanno	David A. Savitz
Nicole E. Martinez	Tony C. Slaba

2022 Council Membership, Affiliation, and Current Term

Isaf Al-Nabulsi	U.S. Department of Energy	2022–2028
Sally A. Amundson	Columbia University Medical Center	2022–2028
Jeri L. Anderson	National Institute for Occupational Safety and Health	2020–2026
Armin Ansari	Centers for Disease Control and Prevention	2021–2027
A. Iulian Apostoaei	Oak Ridge Center for Risk Analysis, Inc.	2018–2024
Kimberly E. Applegate	University of Kentucky	2019–2025
Edouard I. Azzam	Canadian Nuclear Laboratories	2018–2024
Jonine L. Bernstein	Memorial Sloan-Kettering Cancer Center	2018–2024
Luiz Bertelli	Los Alamos National Laboratory	2019–2025
William F. Blakely	Armed Forces Radiobiology Research Institute	2021–2027
Daniel J. Blumenthal	U.S. Department of Energy	2021–2027

John D. Boice, Jr.	National Council on Radiation Protection and Measurements	2018–2024
Wesley E. Bolch	University of Florida	2017–2023
Michael A. Boyd	U.S. Environmental Protection Agency	2020–2026
Richard R. Brey	Idaho State University	2019–2025
Brooke R. Buddemeier	Lawrence Livermore National Laboratory	2021–2027
Manuela Buonanno	Columbia University	2022–2028
Jerrold T. Bushberg	University of California, Davis	2020–2026
Emily A. Caffrey	University of Alabama Birmingham	2021–2027
Polly Y. Chang	SRI International	2017–2023
Jeffrey A. Chapman	Oak Ridge National Laboratory	2021–2027
C. Norman Coleman	National Cancer Institute	2022–2028
Donald A. Cool	Retired	2019–2025
Lawrence T. Dauer	Memorial Sloan-Kettering Cancer Center	2018–2024
Sara D. DeCair	U.S. Environmental Protection Agency	2017–2023
Christine A. Donahue	Weiss Associates	2021–2027
Joseph R. Dynlacht	Indiana University School of Medicine	2020–2026
Andrew J. Einstein	Columbia University	2019–2025
K. Frieda Fisher-Tyler	State of Delaware	2020–2026
Cynthia Flannery	U.S. Nuclear Regulatory Commission	2017–2023
Patricia A. Fleming	Retired	2021–2027
Donald P. Frush	Duke University Medical Center	2022–2028
Eric M. Goldin	Retired	2021–2027
Eric J. Grant	Radiation Effects Research Foundation	2019–2025
Helen A. Grogan	Cascade Scientific, Inc.	2020–2026
Barbara L. Hamrick	University of California, Irvine Health	2019–2025
Willie O. Harris	CN Associates	2017–2023
Lawrence H. Heilbronn	University of Tennessee	2019–2025
Kathryn D. Held	National Council on Radiation Protection and Measurements & Massachusetts General Hospital	2018–2024
Kathryn A. Higley	Oregon State University	2020–2026
E. Vincent Holahan	U.S. Nuclear Regulatory Commission	2019–2025
Janice L. Huff	National Aeronautics and Space Administration	2017–2023
Adam R. Hutter	National Urban Security Technology Laboratory	2019–2025
Randall N. Hyer	Center for Risk Communication	2022–2028
Carol J. Iddins	Radiation Emergency Assistance Center/Training Site	2021–2027
William E. Irwin	Vermont Department of Health	2021–2027
Thomas E. Johnson	Colorado State University	2018–2024
Derek W. Jokisch	Francis Marion University	2021–2027
Cynthia G. Jones	U.S. Nuclear Regulatory Commission	2017–2023

Ziad N. Kazzi	Emory University	2019–2025
William E. Kennedy, Jr.	WE Kennedy Consulting	2022–2028
Gladys A. Klemic	U.S. Department of Homeland Security	2022–2028
Linda A. Kroger	Retired	2022–2028
Amy Kronenberg	Lawrence Berkeley National Laboratory	2017–2023
Evagelia C. Laiakis	Georgetown University	2019–2025
Edwin M. Leidholdt, Jr.	U.S. Department of Veterans Affairs	2018–2024
Mark P. Little	National Cancer Institute	2022–2028
Mahadevappa Mahesh	Johns Hopkins Hospital	2021–2027
Nicole E. Martinez	Oak Ridge National Laboratory	2022–2028
Ruth E. McBurney	Conference of Radiation Control Program Directors, Inc.	2019–2025
Michael T. Milano	University of Rochester Medical Center	2020–2026
Donald L. Miller	Food and Drug Administration	2018–2024
Stephen V. Musolino	Brookhaven National Laboratory	2020–2026
Wayne D. Newhauser	Louisiana State University	2019–2025
Michael A. Noska	U.S. Food and Drug Administration	2017–2023
Harald Paganetti	Massachusetts General Hospital	2018–2024
Christopher N. Passmore	Dosimetry Consulting Services	2017–2023
David J. Pawel	U.S. Environmental Protection Agency	2017–2023
Leticia S. Pibida	National Institute of Standards and Technology	2018–2024
Kathryn H. Pryor	Retired	2022–2028
Mark J. Rivard	Tufts Medical Center	2017–2023
James C. Root	Memorial Sloan Kettering Cancer Center / Weill Cornell Medical College	2022–2028
Adela Salame-Alfie	Centers for Disease Control and Prevention	2021–2027
David A. Savitz	Brown University	2022–2028
Dörthe Schaue	University of California, Los Angeles	2021–2027
Debra M. Scroggs	Retired	2018–2024
J. Anthony Seibert	University of California Davis Medical Center	2020–2026
Kathleen L. Shingleton	Retired	2017–2023
Angela Shogren	U.S. Environmental Protection Agency	2019–2025
Igor Shuryak	Columbia University Medical Center	2018–2024
Steven L. Simon	Retired	2022–2028
Tony C. Slaba	NASA Langley Research Center	2022–2028
David C. Spelic	U.S. Food and Drug Administration	2022–2028
Michael D. Story	University of Texas, Southwestern Medical Center at Dallas	2020–2026
Julie M. Sullivan	U.S. Food and Drug Administration	2019–2025
Steven G. Sutlief	Banner MD Anderson Cancer Center	2018–2024
Julie K. Timins	New Jersey Commission on Radiation Protection	2022–2028

Sergei Tolmachev	Washington State University	2020–2026
Michael M. Weil	Colorado State University	2017–2023
Jeffrey J. Whicker	Los Alamos National Laboratory	2017–2023
Robert C. Whitcomb, Jr.	Retired	2020–2026
Jessica S. Wieder	Federal Emergency Management Agency	2017–2023
Jacqueline P. Williams	University of Rochester Medical College	2018–2024
Gayle E. Woloschak	Northwestern University	2021–2027
X. George Xu	University of Science and Technology China	2020–2026
R. Craig Yoder	Retired	2020–2026
Lydia B. Zablotska	University of California, San Francisco	2020–2026
Pat B. Zanzonico	Memorial Sloan-Kettering Cancer Center	2018–2024
Cary J. Zeitlin	Leidos	2020–2026

Board of Directors

Jerrold T. Bushberg, *Chair*

Wesley E. Bolch	Christine A. Donahue**	Michael D. Story
Michael A. Boyd	Kathryn D. Held	Jeffrey J. Whicker
Brooke R. Buddemeier*	Donald L. Miller	Jessica S. Wieder
Polly Y. Chang	J. Anthony Seibert	

*Elected March 29, 2022.
**Resigned in December 2022.

Officers

President	Kathryn D. Held
Senior Vice President	Jerrold T. Bushberg
Secretary	Laura J. Atwell
Treasurer	Myrna A. Young

Distinguished Emeritus Members

S. James Adelstein, *Vice President Emeritus*
Kenneth R. Kase, *Vice President Emeritus*
W. Roger Ney, *Executive Director Emeritus*†
David A. Schauer, *Executive Director Emeritus*

Lynn R. Anspaugh
Benjamin R. Archer
Stephen Balter
Harold L. Beck
Joel S. Bedford
Eleanor A. Blakely
Andre Bouville
Leslie A. Braby
James A. Brink
Antone L. Brooks
S.Y. Chen
Michael L. Corradini*
J. Donald Cossairt
Allen G. Croff
Paul M. DeLuca
Sarah S. Donaldson
William P. Dornsife
Keith F. Eckerman
Stephen A. Feig
John R. Frazier
Thomas F. Gesell
Ethel S. Gilbert
Ronald E. Goans
Joel E. Gray
Raymond A. Guilmette
Eric J. Hall
Naomi H. Harley
William R. Hendee
F. Owen Hoffman
Bernd Kahn
Ann R. Kennedy
David C. Kocher
Ritsuko Komaki
Susan M. Langhorst
John J. Lanza*
Martha S. Linet
Jill A. Lipoti
Paul A. Locke*
Roger O. McClellan
Barbara J. McNeil
Fred A. Mettler, Jr.
Charles W. Miller
Kenneth L. Miller
A. Alan Moghissi
David S. Myers
Bruce A. Napier
Carl J. Paperiello
John W. Poston, Sr.
Andrew K. Poznanski
R. Julian Preston
Jerome S. Puskin
Genevieve S. Roessler
Marvin Rosenstein
Lawrence N. Rothenberg
Henry D. Royal
Stephen M. Seltzer
Roy E. Shore
Paul Slovic
Daniel J. Strom
Tammy P. Taylor*
John E. Till
Richard E. Toohey
Lawrence W. Townsend
Robert L. Ullrich
Richard J. Vetter
F. Ward Whicker
Chris G. Whipple
Marvin C. Ziskin†

*Elected to Distinguished Emeritus Membership March 29, 2022.
†Deceased during 2022.

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
E. Stephen Amis, Jr.
Larry E. Anderson
Mary M. Austin-Seymour
Judith L. Bader
Daniel J. Barnett
John W. Baum
Steven M. Becker
Merrill A. Bender
Mythreyi Bhargavan-Chatfield
Harold S. Boyne
John W. Brand
David J. Brenner
A. Bertrand Brill
Thomas F. Budinger
John F. Cardella
Stephanie K. Carlson
Paul L. Carson
Donald K. Chadwick
Lawrence L. Chi
Chung-Kwang Chou
Kelly L. Classic
James E. Cleaver
Fred T. Cross
Francis A. Cucinotta
Stanley B. Curtis
John F. Dicello
David A. Eastmond
Marc Edwards
Charles M. Eisenhauer
Joe A. Elder
H. Keith Florig
Norman C. Fost
Kenneth R. Foster
Everett G. Fuller
Barry B. Goldberg
Robert L. Goldberg
Marvin Goldman
John D. Graham
Douglas Grahn
Andrew J. Grosovsky
Milton G. Guiberteau
Roger W. Harms
Martin Hauer-Jensen
John M. Heslep
John W. Hirshfeld, Jr.
David G. Hoel
Roger W. Howell
George B. Hutchison
Hank C. Jenkins-Smith
John R. Johnson
Timothy J. Jorgensen
Katherine A. Kiel
H. William Koch
Harold L. Kundel
Richard W. Leggett
George R. Leopold
Howard L. Liber
James C. Lin
Thomas A. Lincoln
Jonathan M. Links
David I. Livermore
Richard A. Luben
Jay H. Lubin
Arthur C. Lucas†
Alan G. Lurie*
Harry R. Maxon
Donald M. Mayer
C. Douglas Maynard
Claire M. Mays
Cynthia H. McCollough
Jack Miller
William H. Miller
John E. Moulder†
Gregory A. Nelson
Andrea K. Ng
Eugene F. Oakberg
Gilbert S. Omenn
Frank L. Parker†
Terry C. Pellmar
Lester J. Peters
Abram Recht
Allan C.B. Richardson
Robert Robbins
Sara Rockwell
Robert E. Rowland
Ehsan Samei
Jonathan M. Samet
Robert A. Schlenker
Beth A. Schueler
Thomas M. Seed
George Sgouros
Ferdinand J. Shore
Edward A. Sickles
Kenneth W. Skrable
David H. Sliney
Christopher G. Soares
Michael G. Stabin
Daniel O. Stram
Louise C. Strong
Glenn M. Sturchio*
Herman D. Suit†
Richard A. Tell
Elizabeth L. Travis
Lois B. Travis
Fong Y. Tsai
Louis K. Wagner
Stuart C. White
J. Frank Wilson
Shaio Y. Woo
Andrew J. Wyrobek
Marco A. Zaider
Gary H. Zeman

*Consociate Membership effective March 29, 2022.
†Deceased during 2022.

Administrative Committees

Budget & Finance Committee (appointed by the Board of Directors, March 30, 2022)

William E. Kennedy, Jr., *Chair*

Willie O. Harris
Kathryn A. Higley
Kathleen L. Shingleton
R. Craig Yoder

Nominating Committee (appointed by the Board of Directors, March 30, 2022)

Cary J. Zeitlin, *Chair*

Jonine L. Bernstein
Michael A. Boyd
J. Anthony Seibert
Julie M. Sullivan

Program Committee for 2023 Annual Meeting

(appointed by the Board of Directors, March 30, 2022)

Eric J. Grant & Emily A. Caffrey, *Co-Chairs*

Sally A. Amundson
Kristin Fabre
Mark P. Little
R. Julian Preston
Robert L. Ullrich
Michael M. Weil

Scientific & Administrative Staff

Laura J. Atwell	Director of Operations
John D. Boice, Jr.	Director of Science
Emily A. Caffrey	Technical Staff Consultant
Sarah S. Cohen	Technical Staff Consultant
Lawrence T. Dauer	Advisor to President
Laura Finger	Technical Staff Consultant
Helen A. Grogan	Technical Staff Consultant
Julie Lima	Technical Staff Consultant
Cindy L. O'Brien	Consultant
Beverly A. Ottman	Receptionist
Marvin Rosenstein	Technical Staff Consultant
Roy E. Shore	Advisor to Director of Science
Kali Thomas	Technical Staff Consultant
Lawrence W. Townsend	Technical Staff Consultant
Linda Walsh	Technical Staff Consultant
Myrna A. Young	Financial Records Manager

Program Area Committees

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 eight program area committees. They are:

Program Area Committees and Committee Chairs

Basic Criteria, Epidemiology, Radiobiology, and Risk	Gayle E. Woloschak Jonine L. Bernstein
Operational Radiation Safety	Willie O. Harris
Nuclear and Radiological Security and Safety	Brooke R. Buddemeier
Radiation Protection in Medicine	Donald L. Miller Lawrence T. Dauer
Environmental Radiation and Radioactive Waste Issues	William E. Kennedy, Jr.
Radiation Measurements and Dosimetry	Steven L. Simon
Radiation Education, Risk Communication, and Outreach	Randall N. Hyer
Nonionizing Radiation	David A. Savitz

Vice Presidents

Each scientific program area committee is chaired by a 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 chairs of new scientific committees with selection of potential committee or advisory members
- Assist in management of scientific committee efforts
- Provide the chair of the nominating committee with potential candidates for Council membership
- Review all draft publications within their program area committee prior to Council review

Basic Criteria, Epidemiology, Radiobiology, & Risk

Vice President, Gayle E.Woloschak

Goals of Program Area Committee (PAC) 1

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

Members of PAC 1

Gayle E.Woloschak, *Vice President*
Jonine L. Bernstein, *Vice Chair*
Isaf Al-Nabulsi
Sally A. Amundson
A. Iulian Apostoaei
Edouard I. Azzam
Joel S. Bedford
Marjan Boerma
John D. Boice, Jr.
Polly Y. Chang
Eric J. Grant
Nobuyuki Hamada
Ann R. Kennedy
Amy Kronenberg
Evagelia C. Laiakis
Mark P. Little
Gregory A. Nelson
Harald Paganetti
David J. Pawel
James C. Root
Dörthe Schaue
George Sgouros
Roy E. Shore
Brock Sishc
Tony C. Slaba
Michael D. Story
Michael M. Weil
Jacqueline P. Williams
Lydia B. Zablotska

Active Scientific Committees Under PAC 1

SC 1-28 Recommendations on Statistical Approaches to Account for Dose Uncertainties in Radiation Epidemiologic Risk Models
Status: Drafting
Jonine L. Bernstein, *Co-Chair*
Harry M. Cullings, *Co-Chair*
Michael Bellamy
Benjamin C. French
Mark P. Little
Carmen Tekwe
Helen A. Grogan, *Technical Staff Consultant*

Completed in 2022

NCRP Commentary No. 32, *Evaluation of a Sex-Specific Difference in Lung Cancer Radiation Risk and Approaches for Improving Lung Cancer Radiation Risk Projection (with a Focus on Application to Space Activities)*, was issued December 31, 2022. The Commentary was drafted by Scientific Committee 1-27 Co-Chaired by David J. Pawel and Michael M Weil. Committee members included John D. Boice, Jr., Lawrence T. Dauer, Eric J. Grant, Janice L. Huff, Dale L. Preston, Mikhail Sokolnikov, Michael D. Story, Richard Wakeford, Linda Walsh, and Lydia B. Zablotska; and Steve R. Blattnig, NASA Technical Advisor; R. Julian Preston, Advisor; Werner Rühm, Advisor; and Marvin Rosenstein, Technical Staff Consultant.

NCRP

Operational Radiation Safety

Vice President, Willie O. Harris

Goals of Program Area Committee (PAC) 2

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

Members of PAC 2

Willie O. Harris, *Vice President*
Edgar D. Bailey
Christine A. Donahue
Eric M. Goldin
Barbara L. Hamrick
Michael Lewandowski
Michael L. Littleton
David S. Myers
John W. Poston, Sr.
Kathryn H. Pryor
Debra M. Scroggs
Kathleen L. Shingleton
Glenn M. Sturchio
Joshua Walkowicz
James S. Willison
James G. Yusko

Completed in 2022

NCRP Report No. 187, *Operational Radiation Safety Program*, was issued July 8, 2022. The Report was drafted by Scientific Committee 2-8 Chaired by Kathryn H. Pryor. Committee members included Edgar D. Bailey, Christine A. Donahue, Eric M. Goldin, Barbara L. Hamrick, Willie O. Harris, Michael Lewandowski, Michael L. Littleton, David S. Myers, John W. Poston, Sr., Debra M. Scroggs, Kathleen L. Shingleton, Glenn M. Sturchio, Joshua Walkowicz, James S. Willison, and James G. Yusko. Technical Advisors were Elizabeth M. Brackett, Frazier Bronson, and J. Donald Cossairt.

NCRP

Nuclear & Radiological Security & Safety

Vice President, Brooke R. Buddemeier

Goals 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 nuclear or radiological explosions or 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.

Members of PAC 3

Brooke R. Buddemeier, *Vice President*
Armin Ansari
Judith L. Bader
Daniel J. Blumenthal
Thomas W. Chenworth
C. Norman Coleman
Sara D. DeCair
Joseph R. Dynlacht
K. Frieda Fisher-Tyler
Carol J. Iddins
William E. Irwin
Ziad N. Kazzi
Gladys A. Klemic
John J. Lanza (2017 – 2022)
Stephen V. Musolino
Michael A. Noska
Leticia S. Pibida
Adela Salame-Alfie
Julie M. Sullivan

Robert C. Whitcomb, Jr.
Sean M. Crawford, Consultant (2020 – 2022)

Completed in 2022

NCRP Statement No. 14, *Instrument Response Verification and Calibration for Use in Radiation Emergencies*, was issued June 22, 2022. The Statement was drafted by Scientific Committee 3-2 Co-Chaired by Gladys A. Klemic and Leticia S. Pibida. Committee members included Armin Ansari, Brooke R. Buddemeier, William E. Irwin, Michael Iwatschenko-Borho, P. Andrew Karam, and Adela Salame-Alfie; Jeffrey A. Chapman, Technical Advisor; Daryl Fahner, Advisor; Richard T. Kouzes, Advisor / PAC 6 Liaison; and Helen A. Grogan, Technical Staff Consultant.

NCRP Statement No. 15, *Respiratory Protection Recommendations for Workers and Volunteers Responding to a Nuclear Incident Outside the Affected Area*, was issued August 22, 2022. The Statement was drafted by Scientific Committee 3-3 Co-Chaired by Armin Ansari and Adela Salame-Alfie. Committee members included Jeffrey A. Chapman, K. Frieda Fisher-Tyler, and Technical Advisors Ken Yale, Sean M. Crawford, Luis Garcia, Jeffrey Lodwick, Ryan A. Schwartz, Jonathan Szalajda, and Trae Windham; and Emily A. Caffrey, Technical Staff Consultant.

NCRP

Radiation Protection in Medicine

Vice President, Donald L. Miller

Goals 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.
- Examine and evaluate training of medical personnel in radiation protection.

Members of PAC 4

Donald L. Miller, *Vice President*
Lawrence T. Dauer, *Co-Chair*
Kimberly E. Applegate
Stephen Balter
Edward I. Bluth
Andrew J. Einstein
Donald P. Frush
Joel E. Gray
Linda A. Kroger
Edwin M. Leidholdt, Jr.
Alan G. Lurie
Mahadevappa Mahesh
Fred A. Mettler, Jr.
Michael T. Milano
Rebecca Milman
Wayne D. Newhauser
Madan M. Rehani
Mark J. Rivard
J. Anthony Seibert
David C. Spelic
Steven G. Sutlief
Julie E.K. Timins
Shiao Y. Woo
Pat B. Zanzonico
Angela Shogren, *PAC 7 Liaison*

Active Scientific Committees Under PAC 4

SC 4-10 Error Prevention in Radiation Therapy
Status: Preparing for Council review
Steven G. Sutlief, *Co-Chair*
Michael T. Milano, *Co-Chair*
Edwin M. Leidholdt, Jr.
Lukasz Mazur
Jean Moran
Wayne D. Newhauser
Bruce Thomadsen
Shia Y. Woo
Laura Finger, *Technical Staff Consultant*

SC 4-12 Risk Management Stratification of Equipment and Training for Fluoroscopy
Status: Preparing for Council review
Stephen Balter, *Co-Chair*
Donald L. Miller, *Co-Chair*
Kimberly E. Applegate
Lisa Bruedigan
George D. Dangas
Dustin A. Gress
Andrew Kuhis-Gilcrist
Thomas L. Morgan
Andy Rogers
Kevin A. Wunderle

SC 4-13 Patient Shielding in Medical Imaging
Status: Drafting
Rebecca Milman, *Chair*
Veeratrishul Allareddy
Kimberly E. Applegate
Donald P. Frush
Joel E. Gray
Summer L. Kaplan
Emily Marshall
Sarah McKenney
Quentin T. Moore
Darcy J. Wolfman
Emily A. Caffrey, *Technical Staff Consultant*

NCRP

Environmental Radiation & Radioactive Waste Issues

Vice President, William E. Kennedy, Jr.

Goals 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.
- Encourage scientific and technical discourse on the cost-benefit of activities generating radioactive and mixed wastes.

Members of PAC 5

William E. Kennedy, Jr., *Vice President*
Michael A. Boyd
S.Y. Chen
Allen G. Croff
R. William Field
Patricia A. Fleming
Helen A. Grogan
Kathryn A. Higley
E. Vincent Holahan
Katherine A. Kiel
Jill A. Lipoti
Ruth E. McBurney
Bruce A. Napier
Brian A. Powell
Andrew Wallo, III

NCRP

Radiation Measurements & Dosimetry

Vice President, Steven L. Simon

Goals 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.
- 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
Richard R. Brey
Raymond A. Guilmette
Richard T. Kouzes
Jeffrey J. Whicker
R. Craig Yoder
Cary J. Zeitlin
Gary H. Zeman (2013 – 2022)

Active Scientific Committee Under PAC 6

SC 6-13 Methods and Models for Estimating Organ Doses from Intakes of Radium
Status: Drafting
Derek W. Jokisch, *Chair*
Nicole Martinez, *Vice Chair*
Maia Avtandilashvili
Luiz Bertelli
Elizabeth M. Brackett
Emily A. Caffrey

Sara Dumit
Richard Leggett
Caleigh Samuels
Thomas R. LaBone, *Advisor*

Completed in 2022

NCRP Commentary No. 31, *Development of Kinetic and Anatomical Models for Brain Dosimetry for Internally Deposited Radionuclides*, was issued February 14, 2022. The Commentary was drafted by Scientific Committee 6-12, Chaired by Richard W. Leggett and Vice Chair Sergei Y. Tolmachev. Committee members included Maia Avtandilashvili, Keith F. Eckerman, George Sgouros, Gayle E. Woloschak, and Helen A. Grogan, Technical Staff Consultant.

NCRP

Radiation Education, Risk Communication, & Outreach

Vice President, Randall N. Hyer

Goals 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.
- Bolster educational efforts aimed at recruiting, training and retaining radiation health professionals.

Members of PAC 7

Randall N. Hyer, *Vice President*
Manuela Buonanno
Jerrold T. Bushberg
Donald A. Cool
Vince Covello
Thomas E. Johnson
Paul A. Locke
M. Carol McCurley
Charles W. Miller
Judith F. Rader
Angela Shogren
John E. Till
Jessica S. Wieder
Vivi Siegel, *Consultant*

Nonionizing Radiation

Vice President, David A. Savitz

Goals of Program Area Committee (PAC) 8

- 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 PAC 8

David A. Savitz, *Vice Chairman*
Michael D. O'Hara
Vijayalaxmi

Active Scientific Committee Under PAC 8

SC 8-1 Development of NCRP Informational Webpages to Provide Authoritative Information About the Use of Wireless Technology and Current Evidence on Health Effects
Status: Developing website
David A. Savitz, *Chair*
Manuela Buonanno
Gregory Durgin
Randall N. Hyer
Martha S. Linet
Donald L. Miller
Michael D. O'Hara
Vijayalaxmi
Lawrence W. Townsend, *Technical Staff Consultant*

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 2022 are:

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 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
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
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 Chairs 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 Homeland Security
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 2022 are:

Australian Radiation Protection and Nuclear Safety Agency

Bundesamt fur 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 a l'Energie Atomique (France)

Commonwealth Scientific Instrumentation Research
Organization (Australia)

European Commission

Heads of the European Radiological Protection Competent
Authorities

Health Council of the Netherlands

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 Regulation Authority of Japan

Public Health England

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

Contracts & Grants

The following entities have provided support in 2022 for NCRP's work through contracts and grants:

American Board of Radiology Foundation
Centers for Disease Control and Prevention
Conference of Radiation Control Program Directors, Inc.
National Aeronautics and Space Administration
U.S. Department of Energy
U.S. Food and Drug Administration
U.S. Navy

Contributors & Corporate Sponsors

American Academy of Health Physics
American Association of Physicists in Medicine
American College of Radiology Foundation
American Registry of Radiologic Technologists
American Roentgen Ray Society
American Society of Radiologic Technologists
Council on Radionuclides and Radiopharmaceuticals
Individuals
Institute of Electrical and Electronics Engineers
Nuclear Energy Institute
Radiological Society of North America
Society of Pediatric Radiology

Giving Tuesday Donations

A. Iulian Apostoaei
William F. Blakely
John D. Boice, Jr.
Michael A. Boyd
Jerrold T. Bushberg
S. Y. Chen
Keith F. Eckerman
Naomi H. Harley
Willie O. Harris
Lawrence H. Heilbronn
Kathryn D. Held
Kenneth R. Kase
William E. Kennedy, Jr.
Martha S. Linet
Donald L. Miller
Kenneth L. Miller
Christopher N. Passmore
Marvin Rosenstein
Adela Salame-Alfie
Debra M. Scroggs
Julie M. Sullivan
Steven G. Sutlief
Julie E. K. Timins
Richard J. Vetter
James G. Yusko

Review Process

The review process for draft publications is elaborate and comprehensive. It begins with a review by members of the appropriate Program Area Committee and other critical reviewers designated by the 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 (77), 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 documents on the basis of the comments received follows, with the goal of reaching a scientific consensus on the material included in the document. 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 as needed. 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
2022	Long-Term Radiation Animal Studies: A Story Continues	Gayle E. Woloschak
2021	Taking Up Space: The Path to Understanding Radiation Risks	Robert L. Ullrich
2019	Fallout from Nuclear Weapons Tests: Environmental, Health, Political, & Sociological Considerations	André Bouville
2018	Radiation Dosimetry Research for Medicine and Protection: A European Journey	Hans-Georg Menzel
2017	Environmental Radiation and Life: A Broad View	F. Ward Whicker
2016	Radiation Protection and Regulatory Science	John W. Poston, Sr.
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 *What Ifs*, *Wows*, and *Who Cares* 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: *Unde Venimus Quoque Imus*	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 of 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
2022	Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States	Joe W. Gray
2021	Perception of Radiation Risk from the Astronaut Office	Serena M. Auñón-Chancellor
2019	Frontiers in Medical Radiation Science	C. Norman Coleman
2018	Jus·ti·fied and Com·men·su·rate	Marvin Rosenstein
2017	Aren't We Ready Yet? Closing the Planning, Response and Recovery Gaps for Radiological Terrorism	Jack Herrmann
2016	WARP: Where are the Radiation Professionals?	Richard E. Toohey
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.

NCRP

Thomas S. Tenforde Topical Lectures

Year	Title	Lecturer
2022	Opportunities in Radiation Science: Applying Our Collective Knowledge to the Challenges of Our Time	Jill A. Lipoti
2021	Collision or Cooperation? The Law, Ethics & Science of Personalized Risk Assessments for Space & Air Travel	Paul A. Locke
2019	HPS Ask the Experts: Our Most Intriguing Questions & Answers	Genevieve S. Roessler
2018	Recent Epidemiologic Studies and the Linear Nonthreshold Model for Radiation Protection – Considerations Regarding NCRP Commentary No. 27	Roy E. Shore
2015	Ethics and Radiation Protection	Jacques Lochard

NCRP

Annual Meetings

Year	Topic
2022	Opportunities in Radiation Science: From Low Dose to Climate Change
2021	Radiation & Flight: A Down-to-Earth Look at Risks
2019	NCRP Meeting the Challenge at 90: Providing Best Answers to Your Most Pressing Questions About Radiation
2018	Radiation Protection Responsibility in Medicine
2017	Assessment of National Efforts in Emergency Preparedness for Nuclear Terrorism
2016	Meeting the Needs of the Nation for Radiation Protection
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

2022 Annual Meeting

The Fifty-Eighth Annual Meeting of NCRP was held March 28–29, 2022. The topic of the meeting was "Opportunities in Radiation Science: From Low Dose to Climate Change." The sessions and presentations were as follows:

Eighteenth Annual Warren K. Sinclair Keynote Address

Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States, Joe W. Gray

Applying COVID-19 Lessons to Radiological Emergency Response

An American in Asia: Takeaways from the Asian COVID-19 Response, Andrew J. Cordiner

Vaccine Hesitancy and the Social Side to Protective Actions, Monica Schoch-Spana

Applying Lessons from the COVID- 19 Pandemic Response to Radiological/Nuclear Preparedness, Response and Recovery, Orly Amir

Identifying National Defense Needs

National Needs in Emergency Response and Homeland Security, Julian G. Hill

National Need for U.S. Department of Defense's Multiple-Parameter Radiological Biodosimetry/ Dosimetry Diagnostics Network, Ricardo A. Reyes

Optimizing Next Generation Medical Treatment

The "Promise" of Targeted Radiopharmaceutical Therapy, Lisa Bodei

Treatment Optimization in Radiopharmaceutical Therapy, George Sgouros

Optimizing Next Generation Medical Treatment: Identified Opportunities in Medical School Education, Neha Vapiwala

Integrating Knowledge Across Disciplines

"Y" and the Change in Practice of Routine Gonadal Shielding During Radiography, Donald P. Frush

Sometimes a Statement Just Isn't Enough: The Importance of Considering Your Audience and Their Needs, Angela Shogren

Preclinical Studies with Proton FLASH Radiotherapy for Gastrointestinal and Sarcoma Tumors in Rodents and Canines, Constantinos Koumenis

FLASH: High Therapeutic Potential While Sparing Normal Tissue Complications at Ultra-High Dose Rates: Dosimetry Aspects, Magdalena Bazalova-Carter

Forty-Fifth Lauriston S. Taylor Lecture on Radiation Protection & Measurements

Long-Term Radiation Animal Studies: A Story Continues, Gayle E. Woloschak

Understanding Individual Responses to Ionizing Radiation

Potential Modifiers of Radiation-Related Risk of Circulatory Diseases: Implications for Individual Differences in Radiation Response, Preetha Rajaraman

Supporting Space Travel

Space Exploration: Evolving Recommendations for Radiation Protection Standards and Research, S. Robin Elgart

Fifth Thomas S. Tenforde Topical Lecture

Opportunities in Radiation Science: Applying Our Collective Knowledge to the Challenges of Our Time, Jill A. Lipoti

Addressing Waste Management

DOE Cleanup Efforts with Alaskan Native, Native American, Minority and Low-Income Peoples and Communities, Joanna Burger

In-Service Condition of Radon Barriers over Uranium Mill Tailings Disposal Facilities in the United States, Craig Benson

ARPA-E ONWARDS Program: Addressing the Backend of Advanced Reactors Fuel Cycles, Robert Ledoux

Reducing Climate Change Through Nuclear Power

Nuclear Energy - Today and Tomorrow, Hilary Lane

NextGen RP: Applying Remote and Automated Technologies to Enhance and Optimize Nuclear Power Plant Radiation Protection Operations, Karen S. Kim-Stevens

Small Modular Reactor/Advanced Nuclear Reactor Health Physics Challenges, Bryan S. Pell

Interactive: Opportunities in Radiation Science

Evagelia C. Laiakis & Jessica S. Wieder

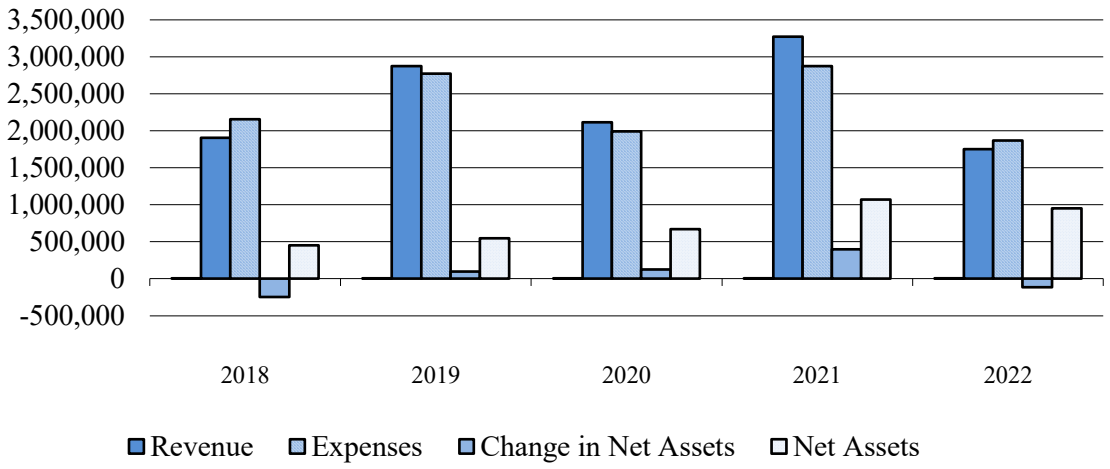
Conclusions

NCRP Vision for the Future and Program Area Committee Activities, Kathryn D. Held

Financial Summary

The table and bar graph presented below exhibit NCRP's year-end financial data for 2022 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
2018	1,905,901	2,152,242	(246,341)	449,284
2019	2,869,835	2,773,607	96,228	545,512
2020	2,114,498	1,989,180	125,318	670,830
2021	3,270,626	2,871,740	398,886	1,069,716
2022	1,752,182	1,869,772	(117,590)	952,126



Appendix 1. Finances

Exhibit A
Statement of Financial Position
For the year ended December 31, 2022

(unaudited)

Current Assets		
Cash and cash equivalents	$	100,954
Investments [at market]		1,173,306
Accounts receivable:		
Publications		2,930
Grants and contracts		124,873
International Commission on Radiation Units and Measurements		1,374
Inventory—publications		55,203
Prepaid expenses and other assets		17,232
Total current assets		1,475,872
Property and Equipment [at cost]		
Furniture and equipment		192,453
Less accumulated depreciation		(189,566)
Total property and equipment		2,887
Right of use asset, net		647,443
TOTAL ASSETS		2,126,202
Liabilities		
Accounts payable and accrued expenses		327,695
Lease liability, current		55,514
Total current liabilities		383,209
Other Liabilities		
Accrued post-retirement benefits		198,938
Lease liability, noncurrent		591,929
Total other liabilities		790,867
TOTAL LIABILITIES		1,174,076

Net Assets	
Without donor restrictions	566,511
With donor restrictions	385,615
TOTAL NET ASSETS	952,126
TOTAL LIABILITIES AND NET ASSETS	$ 2,126,202

Exhibit B
Statement of Activities
For the year ended December 31, 2022
(unaudited)

	Net Assets without Donor Restrictions	Net Assets with Donor Restrictions	Total
Revenue and Other Increases			
Contracts and grants	$ 1,569,616	$ —	$ 1,569,616
Contributions	119,329	—	119,329
Corporate sponsorship	5,000	—	5,000
Contributed professional services	90,475	—	90,475
Sales of publications	108,241	—	108,241
Dividends and interest	32,300	—	32,300
Net realized and unrealized loss on investments	(189,789)	—	(189,789)
Professional and administrative services	17,010	—	17,010
Total revenue and other increases	1,752,182		1,752,182
Expenses and Other Decreases			
Program costs:			
Contracts and grants	1,032,858	—	1,032,858
Publications	36,775	—	36,775
Contributed professional services	90,475	—	90,475
Total program costs	1,160,108	—	1,160,108
Management and general expenses	729,800		729,800
Total expenses	1,889,908		1,889,908
Investment fees	12,281	—	12,281
Post-retirement benefit change	(32,417)	—	(32,417)
	1,869,772		1,869,772
Change in Net Assets	(117,590)		(117,590)
Net Assets at Beginning of Year	684,101	385,615	1,069,716
Net Assets at End of Year	$ 566,511	$ 385,615	$ 952,126

Exhibit C
Statement of Cash Flow
For the year ended December 31, 2022

(unaudited)

Cash flows from operating activities:	
Change in net assets	$ (117,590)
Adjustments to reconcile change in net assets to cash provided by operating activities	
Depreciation and amortization	1,484
Net realized and unrealized gain on investments	189,789
(Increase) decrease in assets:	
Accounts receivable	516,782
Inventory—publications	(3,193)
Prepaid expenses and other assets	656
Increase (decrease) in liabilities:	
Accounts payable and accrued expenses	(362,376)
Deferred revenue	(40,000)
Deferred rent liability	(14,319)
Accrued post-retirement benefits	(33,980)
Net cash provided by operating activities	137,253
Cash flows from investing activities:	
Purchase of equipment	(875)
Purchase of investments	(22,331)
Sale of investments	9,000
Net cash used by investing activities	(14,206)
Cash flows from financing activities:	
Net repayments on line of credit	(250,165)
Net decrease in cash and cash equivalents	(127,118)
Cash and cash equivalents at beginning of year	228,072
Cash and cash equivalents at end of year	$ 100,954

Schedule 1
Schedule of Contracts and Grants Revenue
For the year ended December 31, 2022

(unaudited)

Contracts	
Conference of Radiation Control Program Directors	$ 9,166
U.S. Navy	80,430
Total contracts	**89,596**
Grants	
Centers for Disease Control and Prevention	305,711
National Aeronautics and Space Administration	448,629
U.S. Department of Energy	708,124
U.S. Food and Drug Administration	17,556
Total grants	**1,480,020**
Total contracts and grants revenue	**$ 1,569,616**

Schedule 2
Schedule of Contributions & Corporate Sponsorship Revenue
For the year ended December 31, 2022

(unaudited)

Contributions	
American Academy of Health Physics	$ 1,000
American Association of Physicists in Medicine	5,400
American Board of Radiation Foundation	20,000
American College of Radiology	25,000
American Registry of Radiologic Technologists	6,000
American Roentgen Ray Society	7,500
American Society of Radiologic Technologists	6,000
Council on Radionuclides and Radiopharmaceuticals	2,000
Individuals	15,731
Institute of Electrical and Electronics Engineers	5,000
Radiological Society of North America	25,000
Society of Pediatric Radiology	500
Total contributions	**$ 119,131**
Corporate Sponsors	
Nuclear Energy Institute	$ 5,000
Total Corporate Sponsors	**$ 5,000**

Appendix 2. Publications

Distribution of NCRP Publications

(during the period May 16, 1931 through December 31, 2022)

No.	Title and Year of Publication	Number of Copies Distributed				
		Government Printing Office[a]	By NCRP Secretariat[b] 2022		Total NCRP Publications[c]	All Sources Combined
			Hardcopy	E-Pub		
NCRP Reports						
187	Operational Radiation Safety Program (2022)	__d	75	271	346	346
186	Approaches for Integrating Information from Radiation Biology and Epidemiology to Enhance Low-Dose Health Risk Assessment (2020)	__d	7	42	342	342
185	Evaluating and Communicating Radiation Risks for Studies Involving Human Subjects: Guidance for Researchers and Institutional Review Boards (2020)	__d	6	73	534	534
184	Medical Radiation Exposure of Patients in the United States (2019)	__d	12	140	971	971
183	Radiation Exposure in Space and the Potential for Central Nervous System Effects: Phase II (2019)	__d	3	28	267	267
182	Radiation Safety of Sealed Radioactive Sources (2019)	__d	0	44	519	519
181	Evaluation of the Relative Effectiveness of Low-Energy Photons and Electrons in Inducing Cancer in Humans (2018)	__d	0	22	408	408
180	Management of Exposure to Ionizing Radiation: Radiation Protection Guidance for the United States (2018) (2018)	__d	9	87	768	768
179	Guidance for Emergency Response Dosimetry (2017)	__d	3	40	506	506
178	Deriving Organ Doses and Their Uncertainty for Epidemiologic Studies (with a Focus on the One Million U.S. Workers and Veterans Study of Low-Dose Radiation Health Effects) (2018)	__d	2	17	279	279
177	Radiation Protection in Dentistry and Oral & Maxillofacial Imaging (2019)	__d	22	164	927	927
176	Radiation Safety Aspects of Nanotechnology (2017)	__d	0	10	300	300
175	Decision Making for Late-Phase Recovery from Major Nuclear or Radiological Incidents (2014)	__d	6	28	738	738
174	Preconception and Prenatal Radiation Exposure: Health Effects and Protective Guidance (2013)	__d	0	94	1,804	1,804

No.	Title and Year of Publication	Number of Copies Distributed				
		Government Printing Office[a]	By NCRP Secretariat[b]		Total NCRP Publications[c]	All Sources Combined
			2022			
			Hardcopy	E-Pub		
173	Investigation of Radiological Incidents (2012)	__d	5	28	906	906
172	Reference Levels and Achievable Doses in Medical and Dental Imaging: Recommendations for the United States (2012)	__d	0	89	1,801	1,801
171	Uncertainties in the Estimation of Radiation Risks and Probability of Disease Causation (2012)	__d	1	17	927	927
170	Second Primary Cancers and Cardiovascular Disease After Radiation Therapy (2011)	__d	1	28	844	844
169	Design of Effective Radiological Effluent Monitoring and Environmental Surveillance Programs (2010)	__d	2	8	490	490
168	Radiation Dose Management for Fluoroscopically-Guided Interventional Medical Procedures (2010)	__d	1	148	2,291	2,291
167	Potential Impact of Genetic Susceptibility and Previous Radiation Exposure on Radiation Risk for Astronauts (2010)	__d	0	6	380	380
166	Population Monitoring and Radionuclide Decorporation Following a Radiological or Nuclear Incident (2010)	__d	1	12	663	663
165	Responding to a Radiological or Nuclear Terrorism Incident: A Guide for Decision Makers (2010)	__d	1	99	1,593	1,593
164	Uncertainties in Internal Radiation Dosimetry (2009)	__d	0	14	580	580
163	Radiation Dose Reconstruction: Principles and Practices (2009)	__d	4	13	960	960
162	Self Assessment of Radiation-Safety Programs (2009)	__d	2	28	1,128	1,128
161	Management of Persons Contaminated with Radionuclides (2009)	__d	0	66	2,059	2,059
160	Ionizing Radiation Exposure of the Population of the United States (2009)	__d	1	107	3,306	3,306
159	Risk to the Thyroid from Ionizing Radiation (2008)	__d	1	14	674	674
158	Uncertainties in the Measurement and Dosimetry of External Radiation (2007)	__d	0	23	1,451	1,451
157	Radiation Protection in Educational Institutions (2007)	__d	1	13	1,186	1,186
156	Development of a Biokinetic Model for Radionuclide-Contaminated Wounds and Procedures for Their Assessment, Dosimetry and Treatment (2006)	__d	2	11	1,046	1,046
155	Management of Radionuclide Therapy Patients (2006)	__d	1	104	2,414	2,414
154	Cesium-137 in the Environment: Radioecology and Approaches to Assessment and Management (2006)	__d	0	4	789	789

No.	Title and Year of Publication	Number of Copies Distributed				
		Government Printing Office[a]	By NCRP Secretariat[b]		Total NCRP Publications[c]	All Sources Combined
			2022			
			Hardcopy	E-Pub		
153	Information Needed to Make Radiation Protection Recommendations for Space Missions Beyond Low-Earth Orbit (2006)	__d	1	6	962	962
152	Performance Assessment of Near-Surface Facilities for Disposal of Low-Level Radioactive Waste (2005)	__d	1	6	754	754
151	Structural Shielding Design and Evaluation for Megavoltage X- and Gamma-Ray Radiotherapy Facilities (2005)	__d	0	767	7,959	7,959
150	Extrapolation of Radiation-Induced Cancer Risks from Nonhuman Experimental Systems to Humans (2005)	__d	0	2	949	949
149	A Guide to Mammography and Other Breast Imaging Procedures (2004)	__d	1	28	1,745	1,745
148	Radiation Protection in Veterinary Medicine (2004)	__d	2	39	1,709	1,709
147	Structural Shielding Design for Medical X-Ray Imaging Facilities (2004)	__d	3	367	7,803	7,803
	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	0	5	1,283	1,283
145	Radiation Protection in Dentistry (2003)	__d	0	85	3,346	3,346
144	Radiation Protection for Particle Accelerator Facilities (2003)	__d	5	71	3,128	3,128
143	Management Techniques for Laboratories and Other Small Institutional Generators to Minimize Off-Site Disposal of Low-Level Radioactive Waste (2003)	__d	2	5	920	920
142	Operational Radiation Safety Program for Astronauts in Low-Earth Orbit: A Basic Framework (2002)	__d	0	4	1,373	1,373
141	Managing Potentially Radioactive Scrap Metal (2002)	__d	0	8	1,443	1,443
140	Exposure Criteria for Medical Diagnostic Ultrasound: II. Criteria Based on All Known Mechanisms (2002)	__d	0	9	1,138	1,138
139	Risk-Based Classification of Radioactive and Hazardous Chemical Wastes (2002)	__d	0	5	1,168	1,168
138	Management of Terrorist Events Involving Radioactive Material (2001)	__d	1	17	7,931	7,931
137	Fluence-Based and Microdosimetric Event-Based Methods for Radiation Protection in Space (2001)	__d	0	2	978	978
136	Evaluation of the Linear-Nonthreshold Dose-Response Model for Ionizing Radiation (2001)	__d	1	13	1,870	1,870
135	Liver Cancer Risk from Internally-Deposited Radionuclides (2001)	__d	0	3	1,286	1,286

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		Government Printing Office[a]	By NCRP Secretariat[b]		Total NCRP Publications[c]	All Sources Combined
			2022			
			Hardcopy	E-Pub		
134	Operational Radiation Safety Training (2000)	__d	2	21	1,841	1,841
133	Radiation Protection for Procedures Performed Outside the Radiology Department (2000)	__d	0	33	2,229	2,229
132	Radiation Protection Guidance for Activities in Low-Earth Orbit (2000)	__d	1	10	1,268	1,268
131	Scientific Basis for Evaluating the Risks to Populations from Space Applications of Plutonium (2001)	__d	1	3	962	962
130	Biological Effects and Exposure Limits for “Hot Particles” (1999)	__d	1	11	1,379	1,379
129	Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies (1999)	__d	2	5	1,886	1,886
128	Radionuclide Exposure of the Embryo/Fetus (1998)	__d	0	19	2,041	2,041
127	Operational Radiation Safety Program (1998)	__d	0	38	3,073	3,073
126	Uncertainties in Fatal Cancer Risk Estimates Used in Radiation Protection (1997)	__d	0	7	2,188	2,188
125	Deposition, Retention and Dosimetry of Inhaled Radioactive Substances (1997)	__d	0	5	2,781	2,781
124	Sources and Magnitude of Occupational and Public Exposures from Nuclear Medicine Procedures (1996)	__d	0	34	3,650	3,650
123	Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Ground (1996)	__d	12	50	3,552	3,552
122	Use of Personal Monitors to Estimate Effective Dose Equivalent and Effective Dose to Workers for External Exposure to Low-LET Radiation (1995)	__d	1	50	3,941	3,941
121	Principles and Application of Collective Dose in Radiation Protection (1995)	__d	0	4	2,690	2,690
120	Dose Control at Nuclear Power Plants (1994)	__d	0	6	3,192	3,192
119	A Practical Guide to the Determination of Human Exposure to Radiofrequency Fields (1993)	__d	1	7	3,778	3,778
118	Radiation Protection in the Mineral Extraction Industry (1993)	__d	0	7	2,808	2,808
117	Research Needs for Radiation Protection (1993)	__d	1	5	2,144	2,144
116	Limitation of Exposure to Ionizing Radiation (1993)	__d	2	135	8,818	8,818
115	Risk Estimates for Radiation Protection (1993)	__d	0	13	3,623	3,623
114	Maintaining Radiation Protection Records (1992)	__d	0	5	2,728	2,728
113	Exposure Criteria for Medical Diagnostic Ultrasound: I. Criteria Based on Thermal Mechanisms (1992)	__d	0	6	3,488	3,488

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			2022			
			Hardcopy	E-Pub		
112	Calibration of Survey Instruments Used in Radiation Protection for the Assessment of Ionizing Radiation Fields and Radioactive Surface Contamination (1991)	__d	0	33	4,327	4,327
111	Developing Radiation Emergency Plans for Academic, Medical and Industrial Facilities (1991)	__d	0	13	4,335	4,335
110	Some Aspects of Strontium Radiobiology (1991)	__d	0	6	2,738	2,738
109	Effects of Ionizing Radiation on Aquatic Organisms (1991)	__d	0	3	2,392	2,392
108	Conceptual Basis for Calculations of Absorbed-Dose Distributions (1991)	__d	0	15	3,462	3,462
107	Implementation of the Principle of As Low As Reasonably Achievable (ALARA) for Medical and Dental Personnel (1990)	__d	1	26	3,741	3,741
106	Limit for Exposure to “Hot Particles” on the Skin (1990)	__d	0	5	3,082	3,082
105	Radiation Protection for Medical and Allied Health Personnel (1989)	__d	0	30	7,240	7,240
104	The Relative Biological Effectiveness of Radiations of Different Quality (1990)	__d	1	13	2,744	2,744
103	Control of Radon in Houses (1989)	__d	0	9	3,989	3,989
102	Medical X-Ray, Electron Beam and Gamma-Ray Protection for Energies up to 50 MeV (Equipment Design, Performance and Use) (1989)	__d	1	37	8,419	8,419
101	Exposure of the U.S. Population from Occupational Radiation (1989)	__d	0	8	4,386	4,386
100	Exposure of the U.S. Population from Diagnostic Medical Radiation (1989)	__d	0	5	5,201	5,201
99	Quality Assurance for Diagnostic Imaging (1988)	__d	0	0	5,590	5,590
98	Guidance on Radiation Received in Space Activities (1989)	__d	0	1	3,596	3,596
97	Measurement of Radon and Radon Daughters in Air (1988)	__d	1	4	4,455	4,455
96	Comparative Carcinogenicity of Ionizing Radiation and Chemicals (1989)	__d	0	0	4,274	4,274
95	Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources (1987)	__d	1	3	4,488	4,488
94	Exposure of the Population in the United States and Canada from Natural Background Radiation (1987)	__d	0	2	4,658	4,658
93	Ionizing Radiation Exposure of the Population of the United States (1987)	__d	0	1	7,646	7,646
92	Public Radiation Exposure from Nuclear Power Generation in the United States (1987)	__d	0	0	3,841	3,841

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		Government Printing Office[a]	By NCRP Secretariat[b]		Total NCRP Publications[c]	All Sources Combined
			2022			
			Hardcopy	E-Pub		
91	Recommendations on Limits for Exposure to Ionizing Radiation (1987)	__d	0	0	8,486	8,486
90	Neptunium: Radiation Protection Guidelines (1988)	__d	1	0	3,038	3,038
89	Genetic Effects from Internally Deposited Radionuclides (1987)	__d	1	1	4,119	4,119
88	Radiation Alarms and Access Control Systems (1986)	__d	0	0	4,997	4,997
87	Use of Bioassay Procedures for Assessment of Internal Radionuclide Deposition (1987)	__d	0	1	4,442	4,442
86	Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields (1986)	__d	1	3	5,566	5,566
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	0	4,454	4,454
83	The Experimental Basis for Absorbed-Dose Calculations in Medical Uses of Radionuclides (1985)	__d	0	0	3,762	3,762
82	SI Units in Radiation Protection and Measurements (1985)	__d	1	0	4,919	4,919
81	Carbon-14 in the Environment (1985)	__d	0	2	4,156	4,156
80	Induction of Thyroid Cancer by Ionizing Radiation (1985)	__d	0	0	4,437	4,437
79	Neutron Contamination from Medical Electron Accelerators (1984)	__d	0	5	5,496	5,496
78	Evaluation of Occupational and Environmental Exposures to Radon and Radon Daughters in the United States (1984)	__d	0	0	6,636	6,636
77	Exposures from the Uranium Series with Emphasis on Radon and Its Daughters (1984)	__d	1	1	6,802	6,802
76	Radiological Assessment: Predicting the Transport, Bioaccumulation, and Uptake by Man of Radionuclides Released to the Environment (1984)	__d	0	0	6,839	6,839
75	Iodine-129: Evaluation of Release from Nuclear Power Generation (1983)	__d	0	0	6,079	6,079
74	Biological Effects of Ultrasound: Mechanisms and Clinical Implications (1983)	__d	0	1	11,441	11,441
73	Protection in Nuclear Medicine and Ultrasound Diagnostic Procedures in Children (1983)	__d	0	0	5,684	5,684
72	Radiation Protection and Measurement for Low-Voltage Neutron Generators (1983)	__d	2	1	4,621	4,621
71	Operational Radiation Safety—Training (1983)	__d	0	0	5,075	5,075
70	Nuclear Medicine—Factors Influencing the Choice and Use of Radionuclides in Diagnosis and Therapy (1982)	__d	0	0	5,619	5,619

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		Government Printing Office[a]	By NCRP Secretariat[b]		Total NCRP Publications[c]	All Sources Combined
			2022			
			Hardcopy	E-Pub		
69	Dosimetry of X-Ray and Gamma-Ray Beams for Radiation Therapy in the Energy Range 10 keV to 50 MeV (1981)	__d	0	1	5,384	5,384
68	Radiation Protection in Pediatric Radiology (1981)	__d	0	0	4,754	4,754
67	Radiofrequency Electromagnetic Fields—Properties, Quantities and Units, Biophysical Interaction and Measurements (1981)	__d	0	0	5,667	5,667
66	Mammography (1980)	__d	0	0	4,598	4,598
65	Management of Persons Accidentally Contaminated with Radionuclides (1980)	__d	0	2	18,685	18,685
64	Influence of Dose and Its Distribution in Time on Dose-Response Relationships for Low-LET Radiations (1980)	__d	0	0	5,435	5,435
63	Tritium and Other Radionuclide Labeled Organic Compounds Incorporated in Genetic Material (1979)	__d	0	0	4,463	4,463
62	Tritium in the Environment (1979)	__d	0	2	4,123	4,123
61	Radiation Safety Training Criteria for Industrial Radiography (1978)	__d	0	0	6,325	6,325
60	Physical, Chemical and Biological Properties of Radiocerium Relevant to Radiation Protection Guidelines (1979)	__d	0	0	4,176	4,176
59	Operational Radiation Safety Program (1979)	__d	0	0	8,046	8,046
58	A Handbook of Radioactivity Measurements Procedures (1978)	__d	7	3	14,031	14,031
57	Instrumentation and Monitoring Methods for Radiation Protection (1978)	__d	0	0	11,279	11,279
56	Radiation Exposure from Consumer Products and Miscellaneous Sources (1977)	__d	0	0	5,905	5,905
55	Protection of the Thyroid Gland in the Event of Releases of Radioiodine (1977)	__d	0	0	7,021	7,021
54	Medical Radiation Exposure of Pregnant and Potentially Pregnant Women (1977)	__d	0	0	11,099	11,099
53	Review of NCRP Radiation Dose Limit for Embryo and Fetus in Occupationally Exposed Women (1977)	__d	0	0	9,289	9,289
52	Cesium-137 from the Environment to Man: Metabolism and Dose (1977)	__d	0	0	4,866	4,866
51	Radiation Protection Design Guidelines for 0.1-100 MeV Particle Accelerator Facilities (1977)	__d	0	0	8,515	8,515
50	Environmental Radiation Measurements (1976)	__d	0	1	8,114	8,114

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49	Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies up to 10 MeV (1976)	__d	0	5	18,983	18,983
	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	2	3	6,548	6,548
46	Alpha-Emitting Particles in Lungs (1975)	__d	1	1	6,245	6,245
45	Natural Background Radiation in the United States (1975)	__d	__e	0	7,296	7,296
44	Krypton-85 in the Atmosphere—Accumulation, Biological Significance, and Control Technology (1975)	__d	0	0	6,708	6,708
43	Review of the Current State of Radiation Protection Philosophy (1975)	__d	__e	0	9,722	9,722
42	Radiological Factors Affecting Decision-Making in a Nuclear Attack (1974)	__d	0	2	47,419	47,419
41	Specification of Gamma-Ray Brachytherapy Sources (1974)	__d	0	0	5,735	5,735
40	Protection Against Radiation from Brachytherapy Sources (1972)	__d	0	0	10,271	10,271
39	Basic Radiation Protection Criteria (1971)	__d	__e	0	40,393	40,393
38	Protection Against Neutron Radiation (1971)	__d	1	1	9,316	9,316
37	Precautions in the Management of Patients who have Received Therapeutic Amounts of Radionuclides (1970)	__d	0	0	17,402	17,402
36	Radiation Protection in Veterinary Medicine (1970)	__d	0	0	7,620	7,620
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	17,662	17,662
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	22,363	22,363
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	0	0	9,955	34,405
29	Exposure to Radiation in an Emergency	55,705	__e	0	3,679	59,384
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	0	0	3,836	7,980

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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	0	0	7,450	59,976
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
13	Protection Against Radiation from Radium, Cobalt-60 and Cesium-137 (1954)	22,785	__e	0	0	22,785
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	1	0	7,660	58,160
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

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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
	Total NCRP Reports Distributed	959,448	234	4,058	1,014,818	1,974,266
Lauriston S. Taylor Lectures						
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41	Environmental Radiation and Life—A Broad View, by F. Ward Whicker (2017), Health Phys. 114(2):192–203 (2018)	__i	__i	__i		__i
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39	Dosimetry of Internal Emitters: Contributions of Radiation Protection Bodies and Radiological Events, Keith F. Eckerman (2015), Health Phys. 110(2):192–200 (2016)	__i	__i	__i		__i
38	On the Shoulders of Giants: Radiation Protection Over 50 Years, Fred A. Mettler, Jr. (2014), Health Phys. 108(2):102–110 (2015)	__i	__i	__i		__i
37	When Does Risk Assessment Get Fuzzy?, John E. Till (2013), Health Phys. 106(2):148–161 (2014)	__i	__i	__i		__i
36	From the Field to the Laboratory and Back: The *What Ifs*, *Wows,* and *Who Cares* of Radiation Biology, Antone L. Brooks (2012), Health Phys. 105(5):407–421 (2013)	__i	__i	__i		__i
35	What Makes Particle Radiation So Effective?, Eleanor A. Blakely (2011), Health Phys. 103(5):508–528 (2012)	__i	__i	__i		__i
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29	Nontargeted Effects of Radiation: Implications for Low-Dose Exposures, John B. Little (2005), Health Phys. 91:416–426 (2006)	__i	__i	__i		__i
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14	Radiation Protection and the Internal Emitter Saga, J. Newell Stannard (1990)	__d	0	0	354	354
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11	How to Be Quantitative about Radiation Risk Estimates, Seymour Jablon (1987)	__d	0	0	1,023	1,023
10	Biological Effects of Non-Ionizing Radiations: Cellular Properties and Interactions, Herman P. Schwan (1986)	__d	0	0	1,692	1,692
9	Truth (and Beauty) in Radiation Measurement, John H. Harley (1985)	__d	0	0	765	765
8	Limitation and Assessment in Radiation Protection, Harald H. Rossi (1984)	__d	0	0	1,530	1,530
7	The Human Environment—Past, Present and Future, Merril Eisenbud (1983)	__d	0	0	1,034	1,034
6	Ethics, Trade-Offs and Medical Radiation, Eugene L. Saenger (1982)	__d	0	0	1,251	1,251
5	How Well Can We Assess Genetic Risk? Not Very, 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, Harold O. Wyckoff (1980)	__d	0	0	1,852	1,852
3	Radiation Protection—Concepts and Trade Offs, Hymer L. Friedell (1979)	__d	0	0	2,085	2,085
2	Why be Quantitative about Radiation Risk Estimates? Sir Edward E. Pochin (1978)	__d	0	__j	2,338	2,338
1	The Squares of the Natural Numbers in Radiation Protection, Herbert M. Parker (1977)	__d	0	__j	1,513	1,513
	Total Lectures Distributed	0	0	0	21,673	21,673
NCRP Annual Meeting Proceedings						
40	Radiation Protection Responsibility in Medicine, Proceedings of the Fifty-Fourth Annual Meeting held March 5–6, 2018, Health Phys. 116(2):111–294 (2019)	__i	__i	__i		__i

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38	Meeting the Needs of the Nation for Radiation Protection: How Did We Get Here?, Proceedings of the Fifty-Second Annual Meeting held April 11–12, 2016. Health Phys. 112(2):111–234 (2017)	__i	__i	__i		__i
37	Changing Regulations and Radiation Guidance: What Does the Future Hold?, Proceedings of the Fifty-First Annual Meeting held March 16–17, 2015. Health Phys. 110(2):97–237 (2016)	__i	__i	__i		__i
36	NCRP: Achievements of the Past 50 Years and Addressing the Needs of the Future, Proceedings of the Fiftieth Annual Meeting held March 10–11, 2014. Health Phys. 108(2):97–241 (2015)	__i	__i	__i		__i
35	Radiation Dose and the Impacts on Exposed Populations, Proceedings of the Forty-Ninth Annual Meeting held March 11–12, 2013. Health Phys. 106(2):145–329 (2014)	__i	__i	__i		__i
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 7–8, 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
31	Future of Nuclear Power Worldwide: Safety, Health and Environment, Proceedings of the Forty-Fifth Annual Meeting held March 2–3, 2009. Health Phys. 100(1):2–112 (2011)	__i	__i	__i		__i
30	Low Dose and Low Dose-Rate Radiation Effects and Models, Proceedings of the Forty-Fourth Annual Meeting held April 14–15, 2008. Health Phys. 97(5):373–541 (2009)	__i	__i	__i		__i
29	Advances in Radiation Protection in Medicine, Proceedings of the Forty-Third Annual Meeting held April 16–17, 2007. Health Phys. 95(5):461–686 (2008)	__i	__i	__i		__i
28	Chernobyl at Twenty, Proceedings of the Forty-Second Annual Meeting held April 3–4, 2006. Health Phys. 93(5):345–595 (2007)	__i	__i	__i		__i

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27	Managing the Disposition of Low-Activity Radioactive Materials, Proceedings of the Forty-First Annual Meeting held March 30–31, 2005. Health Phys. 91(5):413–536 (2006)	__i	__i	__i	3	3
26	Advances in Consequence Management for Radiological Terrorism Events, Proceedings of the Fortieth Annual Meeting held April 14–15, 2004. Health Phys. 89(5):415–588 (2005)	__i	__i	__i	1	1
	Compact disk version of Proceedings No. 26	__i	0	0	102	102
25	Radiation Protection at the Beginning of the 21st Century—A Look Forward, Proceedings of the Thirty-Ninth Annual Meeting held April 9–10, 2003. Health Phys. 87(3):249–318 (2004)	__i	__i	__i		__i
24	Where the New Biology Meets Epidemiology: Impact on Radiation Risk Estimates, Proceedings of the Thirty-eighth Annual Meeting held April 10–11, 2002. Health Phys. 85(1):1–108 (2003)	__i	__i	__i		__i
23	Fallout from Atmospheric Nuclear Tests—Impact on Science and Society, Proceedings of the Thirty-seventh Annual Meeting held April 4–5, 2001. Health Phys. 82(5):573–748 (2002)	__i	__i	__i		__i
22	Ionizing Radiation Science and Protection in the 21st Century, Proceedings of the Thirty-sixth Annual Meeting held April 5–6, 2000. Health Phys. 80(4):317-402 (2001)	__i	__i	__i		__i
21	Radiation Protection in Medicine: Contemporary Issues, Proceedings of the Thirty-fifth Annual Meeting held April 7–8, 1999 (1999)	__d	0	0	205	205
	Compact disk version of Proceedings No. 21	__d	0	0	82	82
20	Cosmic Radiation Exposure of Airline Crews, Passengers and Astronauts, Proceedings of the Thirty-fourth Annual Meeting held on April 1–2, 1998, Health Phys. **79**(5):466–613 (2000)	__i	__i	__i		__i
19	The Effects of Pre- and Postconception Exposure to Radiation, Proceedings of the Thirty-third Annual Meeting held on April 2–3, 1997, Teratology **59**(4):181–317 (1999)	__i	__i	__i		__i
18	Implications of New Data on Radiation Cancer Risk, Proceedings of the Thirty-second Annual Meeting held April 3–4, 1996 (1997)	__d	0	__j	384	384
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15	Radiation Science and Societal Decision Making, Proceedings of the Twenty-Ninth Annual Meeting held April 7–8, 1993 (1994)	__d	0	__j	565	565
14	Radiation Protection in Medicine, Proceedings of the Twenty-Eighth Annual Meeting held April 1–2, 1992 (1993)	__d	0	__j	847	847
13	Genes, Cancer and Radiation Protection, Proceedings of the Twenty-Seventh Annual Meeting held April 3–4, 1991 (1992)	__d	0	__j	690	690
12	Health and Ecological Implications of Radioactively Contaminated Environments, Proceedings of the Twenty-Sixth Annual Meeting held April 4–5, 1990 (1991)	__d	0	__j	917	917
11	Radiation Protection Today—The NCRP at Sixty Years, Proceedings of the Twenty-Fifth Annual Meeting held April 4–5, 1989 (1990)	__d	0	0	661	661
10	Radon, Proceedings of the Twenty-Fourth Annual Meeting held March 30–31, 1988 (1989)	__d	0	__j	1,454	1,454
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
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NCRP Commentaries						
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24	Health Effects of Low Doses of Radiation: Perspectives on Integrating Radiation Biology and Epidemiology (2015)	__d	1	26	705	705
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20	Radiation Protection and Measurement Issues Related to Cargo Scanning With Accelerator-Produced High-Energy X Rays (2007)	__d	2	8	566	566
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16	Screening of Humans for Security Purposes Using Ionizing Radiation Scanning Systems (2003)	__d	0	6	912	912
15	Evaluating the Reliability of Biokinetic and Dosimetric Models and Parameters Used to Assess Individual Doses for Risk Assessment Purposes (1998)	__d	0	5	844	844
14	A Guide for Uncertainty Analysis in Dose and Risk Assessments Related to Environmental Contamination (1996)	__d	1	5	1,823	1,823
13	An Introduction to Efficacy in Diagnostic Radiology and Nuclear Medicine (Justification of Medical Radiation Exposure) (1995)	__d	0	7	1,635	1,635
12	Radiation Exposure and High-Altitude Flight (1995)	__d	0	11	873	873
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5	Review of the Publication, "Living Without Landfills" (1989)	__d	1	2	3,245	3,245
4	Guidelines for the Release of Waste Water from Nuclear Facilities with Special Reference to the Public Health Significance of the Proposed Release of Treated Waste Waters at Three Mile Island (1987)	__d	0	3	1,011	1,011
3	Screening Techniques for Determining Compliance with Environmental Standards—Releases of Radionuclides to the Atmosphere (1986)	__d	0	0	3,603	3,603
2	Preliminary Evaluation of Criteria for the Disposal of Transuranic Contaminated Waste (1982)	__d	0	0	292	292
1	Krypton-85 in the Atmosphere—with Specific Reference to the Public Health Significance of the Proposed Controlled Release at Three Mile Island (1980)	__d	0	0	697	697
	Total Commentaries Distributed	0	50	417	31,753	31,753

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3	Acceptability of Risk from Radiation—Application to Human Space Flight, Proceedings of a Symposium held May 29, 1996 (1997)	__d	0	0	655	655
2	Radioactive and Mixed Waste—Risk as a Basis for Waste Classification, Proceedings of a Symposium held November 9, 1994 (1995)	__d	0	0	463	463
1	The Control of Exposure of the Public to Ionizing Radiation in the Event of Accident or Attack, Proceedings of a Symposium held April 27-28, 1981 (1982)	__d	0	0	1,849	1,849
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