

Ninth International Symposium on NORM
September 23-27, 2019
Denver, Colorado

NCRP Activities and NORM/TENORM

Kathryn D. Held
National Council on Radiation Protection
and Measurements (NCRP)



NCRP – A Council of 100 Radiation Professionals



1929: U.S. Advisory
Committee on X-Ray and
Radium Protection

1946: U.S. National Committee
on Radiation Protection

1964: National Council on
Radiation Protection and
Measurements **chartered by
Congress** (Public Law 88-376)





Mission of the NCRP

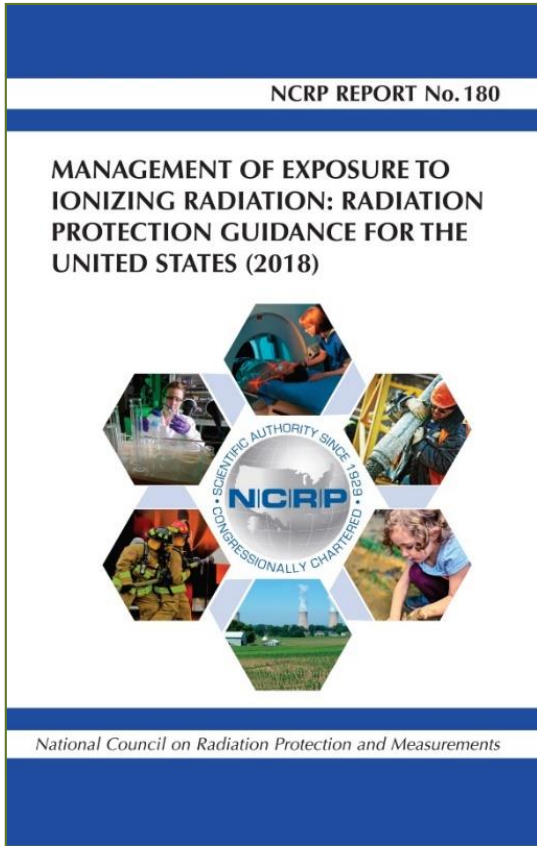
To support radiation protection by providing independent scientific analysis, information, and recommendations that represent the consensus of leading scientists.


A hand holding a blue marker is writing the word "Mission" in white cursive on a dark surface. A red oval is drawn around the word. The background is a blurred outdoor scene with green foliage and a bright light source.

Mission



Advice, Reports, Research



NCRP  **National Council on Radiation Protection and Measurements**
 7910 Woodmont Avenue / Suite 400 / Bethesda, MD 20814-3095
<http://ncrponline.org> / <http://ncrppublications.org>

Where Are the Radiation Professionals (WARP)?
 Synopsis of NCRP Statement No. 12
 January 23, 2015

Background: Since the discovery of x rays and radioactivity in the late 1800s, sources of ionizing radiation have been employed in medicine, academia, industry, power generation, and national defense. To provide for the safe and beneficial use of these sources of radiation, the United States developed a cadre of professionals with the requisite education and experience. Unfortunately, their numbers have diminished alarmingly, as assessed by the National Research Council, the Health Physics Society, and the Government Accountability Office.

Methods: To study the decline in radiation professionals and potential national crisis, the National Council on Radiation Protection and Measurements (NCRP) sponsored a workshop in June 2013 in Arlington, Virginia to evaluate whether a sufficient number of radiation professionals exist now and into the future to support the various radiation disciplines essential to meet national needs. Attendance at this workshop included professionals from government, industry, academia, medicine, and professional societies.

Paper

DOSE RECONSTRUCTION FOR THE MILLION WORKER STUDY: STATUS AND GUIDELINES

André Bouville,* Richard E. Toohey,† John D. Boice, Jr.,‡ Harold L. Beck,§ Larry T. Dauer,**
 Keith F. Eckerman,†† Derek Hagemeyer,‡‡ Richard W. Leggett,†† Michael T. Mumma,§§
 Bruce Napier,*** Kathy H. Pryor,*** Marvin Rosenstein,††† David A. Schauer,‡ Sami Sherbini,‡‡‡
 Daniel O. Stram,§§§ James L. Thompson,**** John E. Till,†††† Craig Yoder,‡‡‡‡ and Cary Zeitlin§§§§



NCRP Publications

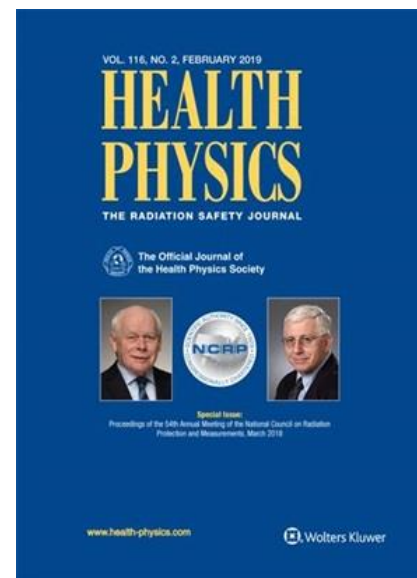
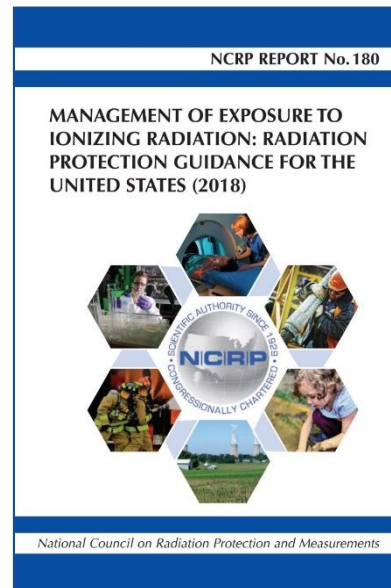
182 Reports

28 Commentaries

12 Statements

Meeting Proceedings

Named Lectures (Taylor, Sinclair, Tenforde)



Seven Program Area Committees (PACs) and Two Council Committees (CCs)

- PAC 1 - Epidemiology & Biology
- PAC 2 - Operational Radiation Safety
- PAC 3 - Security & Safety
- PAC 4 - Medicine
- PAC 5 - Environment & Waste
- PAC 6 - Dosimetry & Measurements
- PAC 7 - Risk Communication & Outreach
- CC-1 – Radiation Protection Guidance for the US (Report No.180; 2018)
- CC-2 – Meeting the Needs of the Nation for Radiation Protection (WARP: Where Are the Radiation Professionals?)

Scientific Committees
under PACs





14 (more or less) Active Committees Under PACs

- SC 1-24P2 – Radiation Exposures in Space/CNS Effects
- SC 1-26 – Integrating Radiation Biology and Epidemiology for Low Dose Risks
- SC 1-27 – Sex-specific Lung Cancer Risks
- SC 2-8 – Operational Radiation Safety Program
- SC 3-2 – Recommendations for Instrument Response Verification and Calibration for Use in Radiation Emergencies
- SC 4-5 – Radiation Protection in Dentistry
- SC 4-7 – Evaluating and Communicating Risks for Human Studies
- SC 4-8 – Improving Patient Dose Utilization in CT
- SC 4-9 – Medical Exposures of Patients in the US
- SC 4-10 – Error Prevention in Radiation Safety
- SC 4-11 – Gonadal Shielding During Abdominal and Pelvic Radiography
- SC 5-2 – Radiation Protection for NORM/TENORM
- SC 6-11 – Medical Worker Dosimetry
- SC 6-12 – Brain Dosimetry for Internal Radionuclides



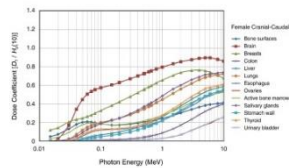
Recently Completed Committee Documents (2018-2019)

- SC 6-9 – Deriving Organ Doses and their Uncertainties
- CC-1 – Radiation Protection Guidance for the United States (2018)
- SC 2-7 – Radiation Safety of Sealed Radioactive Sources
- SC 3-1P2 – Implementation Guidance for Emergency Response Dosimetry

NCRP REPORT No. 178

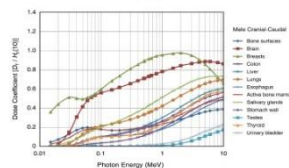
DERIVING ORGAN DOSES AND THEIR UNCERTAINTY FOR EPIDEMIOLOGIC STUDIES

(With a Focus on the One Million U.S. Workers and Veterans Study of Low-Dose Radiation Health Effects)



Female Central Gonad

- Bone surfaces
- Bone
- Breast
- Colon
- Lung
- Esophagus
- Ovary
- Adipose tissue
- Spleen
- Stomach wall
- Urinary bladder



Male Central Gonad

- Bone surfaces
- Bone
- Breast
- Colon
- Lung
- Esophagus
- Adipose tissue
- Spleen
- Stomach wall
- Testis
- Urinary bladder



National Council on Radiation Protection and Measurements

NCRP REPORT No. 180

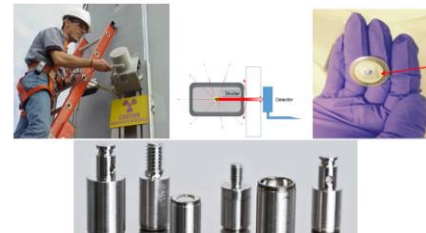
MANAGEMENT OF EXPOSURE TO IONIZING RADIATION: RADIATION PROTECTION GUIDANCE FOR THE UNITED STATES (2018)



National Council on Radiation Protection and Measurements

NCRP REPORT No. 182

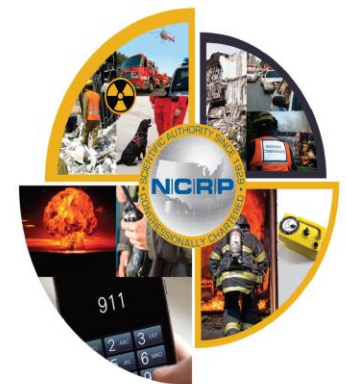
RADIATION SAFETY OF SEALED RADIOACTIVE SOURCES



National Council on Radiation Protection and Measurements

NCRP COMMENTARY No. 28

IMPLEMENTATION GUIDANCE FOR EMERGENCY RESPONSE DOSIMETRY



National Council on Radiation Protection and Measurements



Council Committees, PACs and (Selected) Scientific Committees



Report No. 180: Radiation Protection Guidance for the United States

NCRP REPORT No. 180

MANAGEMENT OF EXPOSURE TO IONIZING RADIATION: RADIATION PROTECTION GUIDANCE FOR THE UNITED STATES (2018)



National Council on Radiation Protection and Measurements

Council Committee (CC)-1



K.R. Kase, *Co-Chair*

D.A. Cool, *Co-Chair*

A. Ansari

J.D. Boice, Jr.

J.T. Bushberg

L.T. Dauer

D.R. Fisher

P.A. Fleming

K.A. Higley

R.N. Hyer

W.E. Irwin



F.A. Mettler, Jr.

D.L. Miller

R.J. Preston

G.E. Woloschak

J.E. Till, *Liaison*

S.J. Adelstein, *Consultant*

R.L. Anderson, *Consultant*

M. Boyd, *Consultant*

M. Rosenstein,

Staff Consultant

Thanks to NRC & CDC for financial support



CC 2: Meeting the Needs of the Nation for Radiation Protection – WARP



W.D. Newhauser (Med Phys), *Co-Chair*
J.P. Williams (Rad Bio), *Co-Chair*

Preparing Commentary *Writing Team Leaders:*

- Edward I. Bluth (Med)
- Michael A. Noska (HP)
- Sergei Tolmachev (Chem)
- Lawrence Townsend (N Engr)
- Lydia Zablotska (Epi)



Thanks to CDC for funding



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Where are the Radiation Professionals (WARP)?

NCRP Statement No. 12, December 17, 2015

Since the discovery of x rays and radioactivity in the 1890s, sources of ionizing radiation have been employed in medicine, academia, industry, power generation, and national defense. To provide for the safe and beneficial use of these sources of radiation, the United States developed a cadre of professionals with the requisite education and experience. Unfortunately, their numbers have diminished alarmingly (AAAS, 2014; GAO, 2014; HPS, 2013; NA/NRC, 2012).

Methods

To study the decline in radiation professionals and potential national crisis, the National Council on Radiation Protection and Measurements (NCRP) sponsored a workshop in June 2013 in Arlington, Virginia to evaluate whether a sufficient number of radiation professionals exist now and into the future to support the various radiation disciplines essential to meet national needs. Attendance at this workshop included professionals from government, industry, academia, medicine, and professional societies. Presentations from over 30 groups (NCRP, 2013) resulted in the recommendations found in this Statement.

Findings

Evidence presented at the workshop revealed that the country is on the verge of a severe shortfall of radiation professionals such that urgent national needs will not be met. Factors contributing to the downturn include the economy, attrition, redirected national priorities, and decreased public funding. The magnitude of this shortfall varies with radiation disciplines and practice area. Radiation biology has already been critically depleted and other specialties are following the same downward spiral. All radiation professionals share the same goals to develop or implement scientific knowledge to protect workers, members of the public, and the environment from harmful effects of exposure to ionizing radiation. Accordingly, the workshop concluded that the current and projected shortfall will adversely affect the public health, radiation occupations, emergency preparedness, and the environment. Major shortfalls have already been observed in day-to-day operations, leaving policy development, regulatory compliance, research and development, environmental monitoring, emergency management, and military applications as unfunded and under-supported mandates.

The dwindling number of professionals will be of particular concern in mounting a response to a catastrophic nuclear or radiological incident, including terrorist attacks. The current concept of operations for response includes surge support from the existing body of radiation professionals to serve as technical subject matter experts to aid in the management of the consequences of such an event. However, as the number of radiation professionals decreases, the nation's resilience and ability to cope and manage a catastrophic nuclear or radiological event is severely degraded.



... radiation professionals in broad and diverse areas such as research and development, environmental monitoring and restoration and response, nuclear medicine, radiation therapy, diagnostic (GAO, 2014) estimates that 31 % of the federal workforce will be percentage of engineering and technical professionals eligible 41 %. Similarly, a survey of the Conference of Radiation Control s that regulate the use of radioactive materials and radiation- that over 50 % of the technical staff in the states' radiation he next 10 y. essed concern about the future supply of radiochemists (NA/NRC, al expertise within government will result in an inability to significant adverse effect on the ability to manage the consequences r power plant accident in the United States. The basic radiation part of a vast enterprise that directly and materially benefits the



PAC 1: Basic Criteria, Epidemiology, Radiobiology, and Risk

The membership of PAC 1 is:

G.E. Woloschak, *Vice President*

J. Bernstein, *Co-Chair*

S.A.

Amundson

E.I. Azzam

J.S. Bedford

P. Chang

N. Hamada

A.R. Kennedy

A. Kronenberg

E.C. Laiakis

M.P. Little

G.A. Nelson

H. Paganetti

D.J. Pawel

G. Sgouros

R.E. Shore

M.D. Story

M.M. Weil

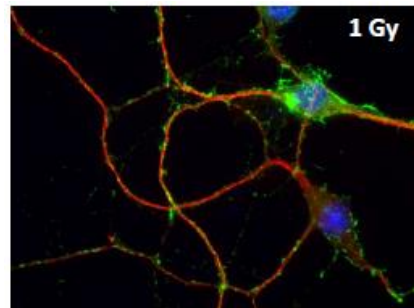
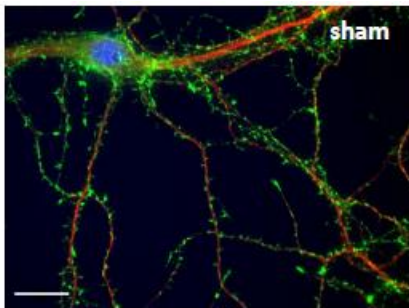
J.P. Williams



SC 1-24P2: Radiation Exposures in Space and the Potential for CNS Effects



Human Exploration Research *Analog* (HERA), JSC



Scale bar: 20 μm
Drebrin/ MAP2/ DAPI

(from Puspitisari, Held, *et al.*, unpublished)



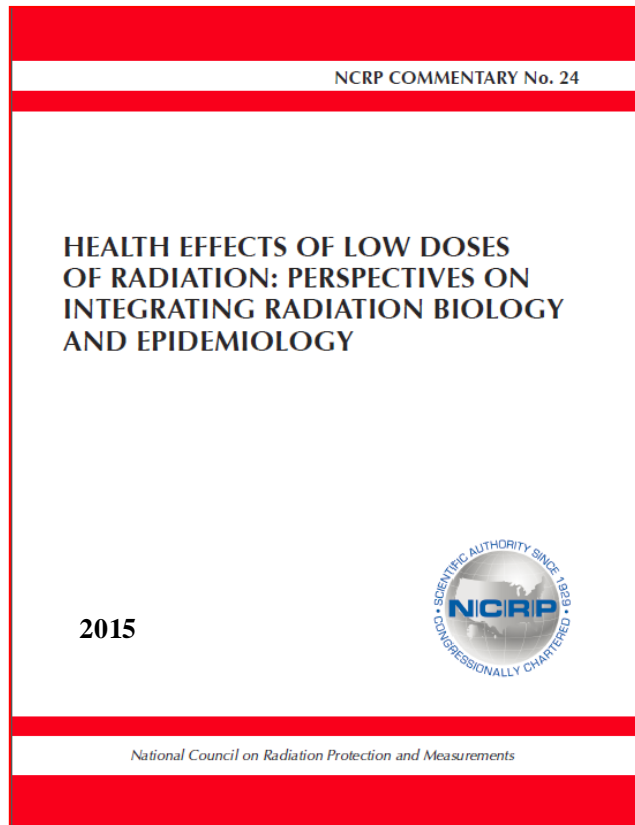
Les Braby



Jacob Raber

Thanks to NASA for funding

SC 1-26: Approaches for Integrating Radiation Biology & Epidemiology for Enhancing Low Dose Risk Assessment



R.J. Preston, *Chair*
W. Rühm, *Co-Chair*
E.I. Azzam
S. Bouffler
M.P. Little
R.E. Shore
I. Shuryak
M.M. Weil
M. Rosenstein, *Staff Consultant*



Thanks to CDC for financial support

SC 1-27: Evaluation of Sex-Specific Differences in Lung Cancer Radiation Risks & Recommendations for Use in Transfer Models



M.M. Weil, *Chair*

J.D. Boice

L.T. Dauer

E.J. Grant

D.G. Hoel

J.L. Huff

D.J. Pawel

S. Blattnig, *NASA Technical Advisor*

R.J. Preston, *Advisor*

W. Rühm, *Advisor*

M. Rosenstein, *Staff Consultant*

D.L. Preston

M. Sokolnikov

M.D. Story

R. Wakeford

L. Walsh

L. Zablotska



Thanks to NASA for funding

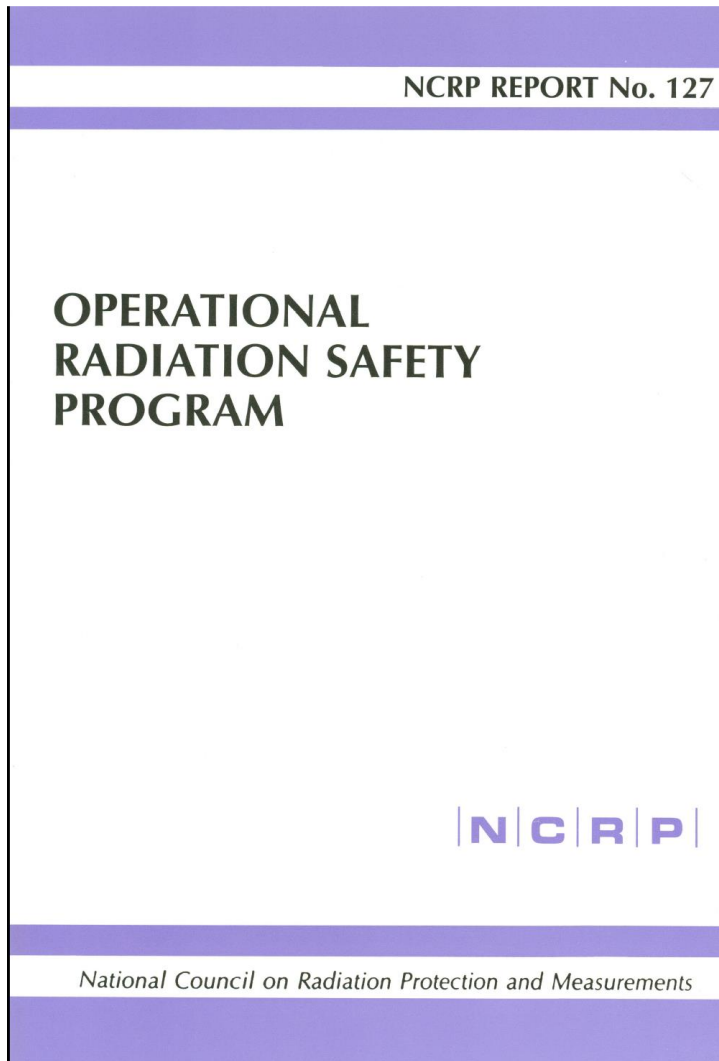


PAC 2: Operational Radiation Safety



K.H. Pryor, *Vice President*
E.D. Bailey
C.A. Donahue
J.R. Frazier
E.M. Goldin
B.L. Hamrick
W. Harris
M. Littleton
D.S. Myers
J.W. Poston
D.M. Scroggs
K. L. Shingleton
G.M. Sturchio
J. Walkowicz
J.S. Willison
J.G. Yusko

SC 2-8: Operational Radiation Safety Program – Revision to Report No. 127 (1998)



K.H. Pryor, *Chair*

E.D. Bailey
C.A. Donahue
J.R. Frazier
E.M. Goldin
B.L. Hamrick
W. Harris
M. Littleton
D.S. Myers

J.W. Poston
D.M. Scroggs
K. L. Shingleton
G.M. Sturchio
J. Walkowicz
J.S. Willison
J.G. Yusko



PAC 3: Nuclear and Radiological Security and Safety

A. Ansari, *Vice President*

B.R. Buddemeier, *Co-Chair*

J.L. Bader

D.J. Blumenthal

C.N. Coleman

S. DeCair

J. Donnelly

J.R. Dynlacht

F. Fisher-Tyler

C.J. Iddins

W.E. Irwin

G.A. Klemic

J.J. Lanza

S.V. Musolino

M.A. Noska

L. Pibida

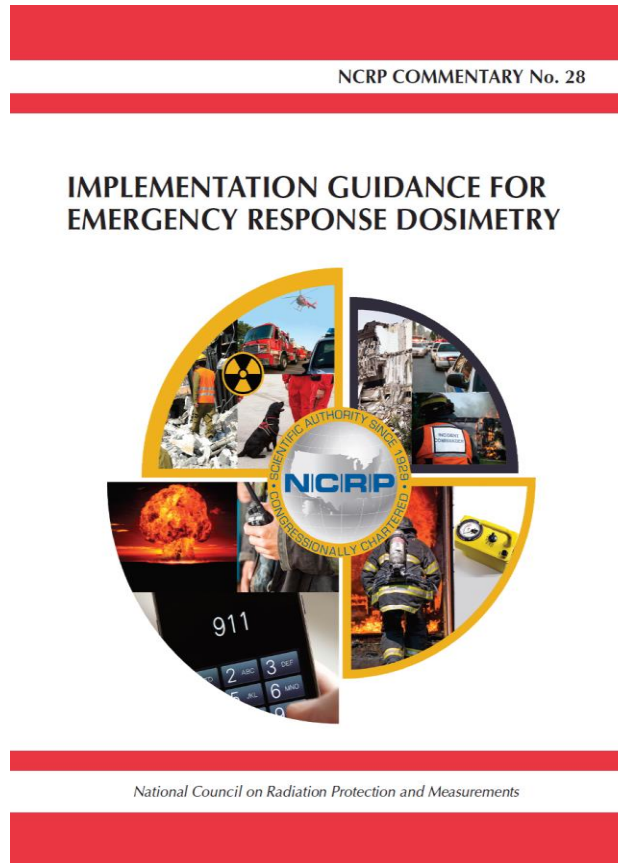
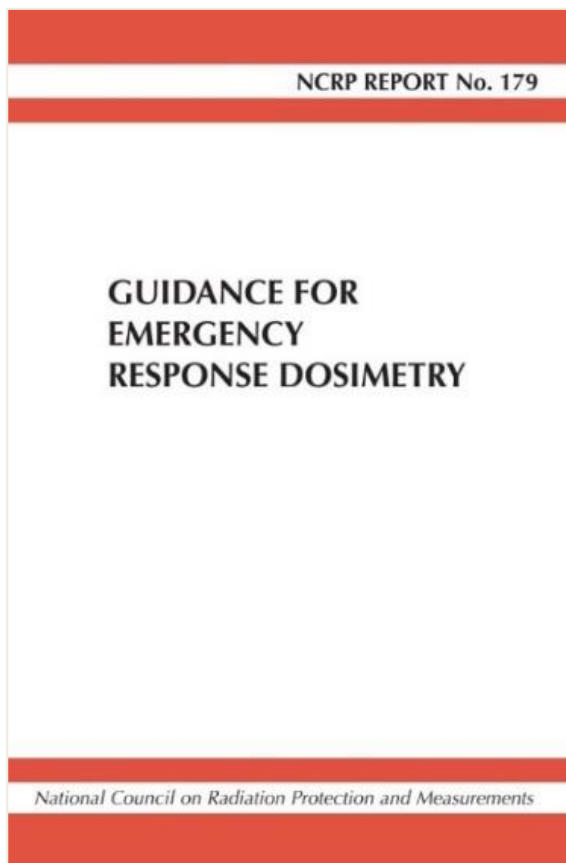
A. Salame-Alfie

B. Stevenson, *Consultant*





SC 3-1: (1) Guidance for Emergency Responder Dosimetry and (2) Implementation Guidance for Responder Dosimetry in an Emergency



Thanks to DHS, CDC, and NYC for financial support



S. V. Musolino, A. Salame-Alfie, *Co-Chairs*



PAC 4:

Radiation Protection in Medicine



The membership of PAC 4 is:

D.L. Miller, *Vice President*

L.T. Dauer, *Co-Chair*

K.E. Applegate

S. Balter

E.I. Bluth

C.E. Chambers

A.J. Einstein

D.P. Frush

J.E. Gray

L.A. Kroger

E.G. Leidholdt

A.G. Lurie

M. Mahesh

F.A. Mettler, Jr.

W.D. Newhauser

M.J. Rivard

J.A. Seibert

D.C. Spelic

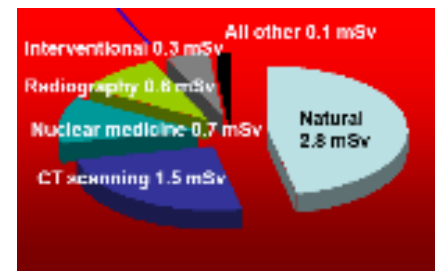
S.G. Sutlief

J.E.K. Timins

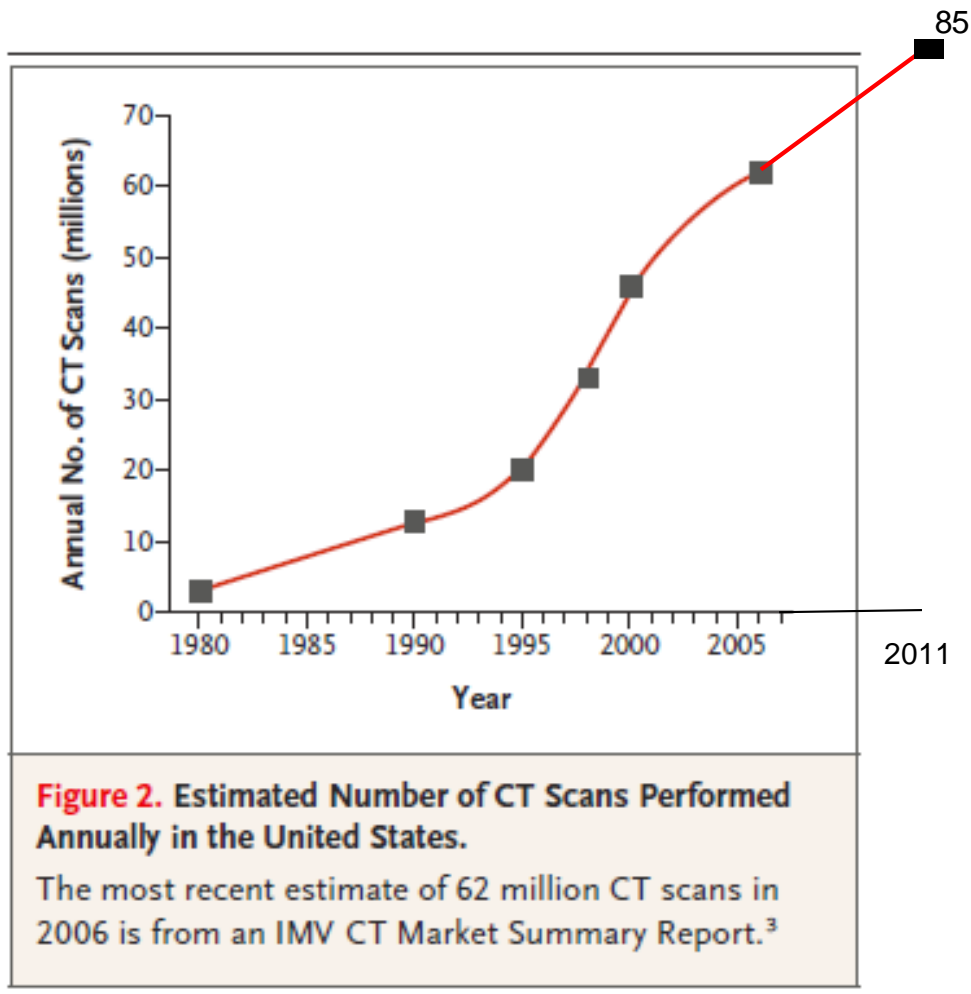
J.P. Winston

S.Y. Woo

P.B. Zanzonico



SC 4-9: Medical Exposure of Patients in the United States



F.A. Mettler, *Chair*



M. Mahesh, *Co-Chair*



Other PAC 4 Current Activities

- SC 4-5: Radiation Protection in Dentistry (Report)
- SC 4-7: Evaluating and Communicating Radiation Risks for Studies Involving Human Subjects: Guidance for Researchers and Reviewing Bodies (Report)
- SC 4-8: Improving Patient Dose Utilization in Computed Tomography (Commentary)
- SC 4-10: Program Components for Error Prevention in Radiation Therapy (Statement)
- SC 4-11: Gonadal Shielding During Abdominal and Pelvic Radiography (Statement)

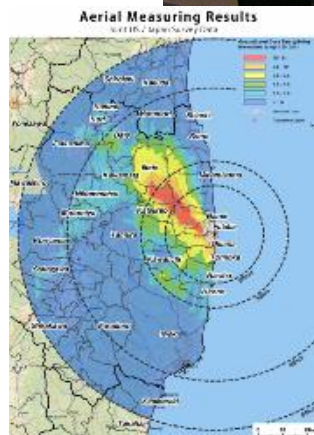
+ 4 other activities under consideration



PAC 5: Environmental Radiation and Radioactive Waste Issues

The membership of PAC 5 is:

B.A. Napier, *Vice President*
M. Boyd
S.Y. Chen
A.G. Croff
R.W. Field
K.A. Higley
E.V. Holahan
W.E. Kennedy
K.A. Kiel
J.A. Lipoti
R.E. McBurney
B.A. Powell
A. Wallo





SC 5-2: Radiation Protection for NORM & TENORM from Oil & Gas Recovery



WE Kennedy,
Chair



D Allard



M Barrie



P Egid



G Forsee



R Johnson



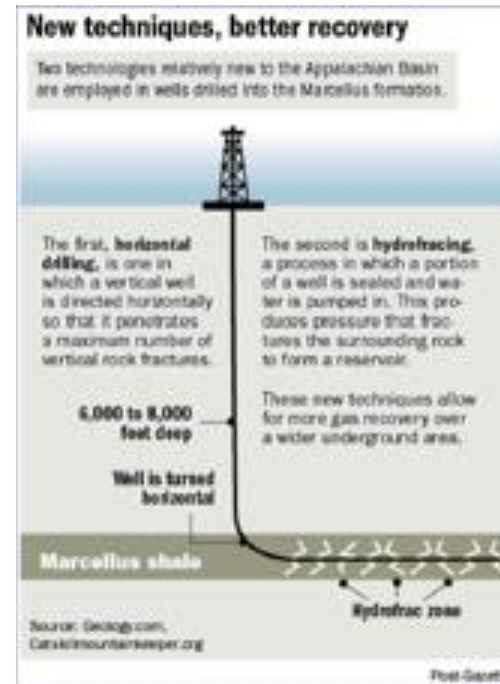
A Lombardo



R McBurney



J Frazier



Thanks to CRCPD and CDC for financial support



PAC 6: Radiation Measurements and Dosimetry



The membership of PAC 6 is:

S.L. Simon, *Vice President*

L. Bertelli

W.F. Blakely

W.E. Bolch

L.A. Braby

R.R. Brey

R.A. Guilmette

R.T. Kouzes

J.J. Whicker

R.C. Yoder

C. Zeitlin

G.H. Zeman



PAC 6 Active Committees

- 1) SC 6-11 Dosimetry Guidance for Medical Radiation Workers with a focus on Lung Dose Reconstruction (Commentary)
- 2) SC 6-12 Development of Models for Brain Dosimetry for Internally Deposited Radionuclides (Commentary)



PAC 7: Radiation Education, Risk Communication, and Outreach

R.N. Hyer, *Vice President*

S.M. Becker

J.T. Bushberg

V. Covello

R. Johnson

P.A. Karam

P. Locke

C. McClurey

C.W. Miller

M. O'Brien

J.F. Rader

A. Shogren

J.E. Till

J.S. Wieder

V. Siegel, *Consultant*



“People don't care how much you know until they know how much you care”



PAC 7: Communications Efforts/Improvements

- Improved “Roll-outs” of documents
- Social media
 - Twitter, Facebook, TEDEd, etc.
 - Social media calendar
 - Social media policy
- Quarterly Newsletter

TEDEd

Discover Create Support

Can you survive nuclear fallout? - Brooke Buddemeier and Jessica S. Wieder

440,580 Views
3,318 Questions Answered

Let's Begin...

Watch

Think

Dig Deeper

Discuss

Customize This Lesson



NCRP_ORG
@NCRP_USA

Following

Congratulations to NCRP Council Members [@jesswieder54321](#) and [@BBuddemeier](#) on becoming TED educators on how to survive nuclear fallout. Take five minutes to learn the science of how "get inside, stay inside, stay tuned" can save your life. Please share.

Jessica Wieder @JessWieder54321

I am officially a TED educator on surviving nuclear fallout!!! Thank you @TED_ED for helping me & @BBuddemeier explain why staying inside for 24 hours can save your life after a nuclear detonation. Take 5 minutes to learn. Please share. #nuclear #fallout [ed.ted.com/lessons/can-yo...](#)

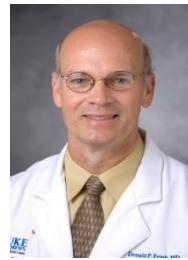
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2 Likes





NCRP Annual Meetings



D Frush
L Dauer,
Co-Chairs

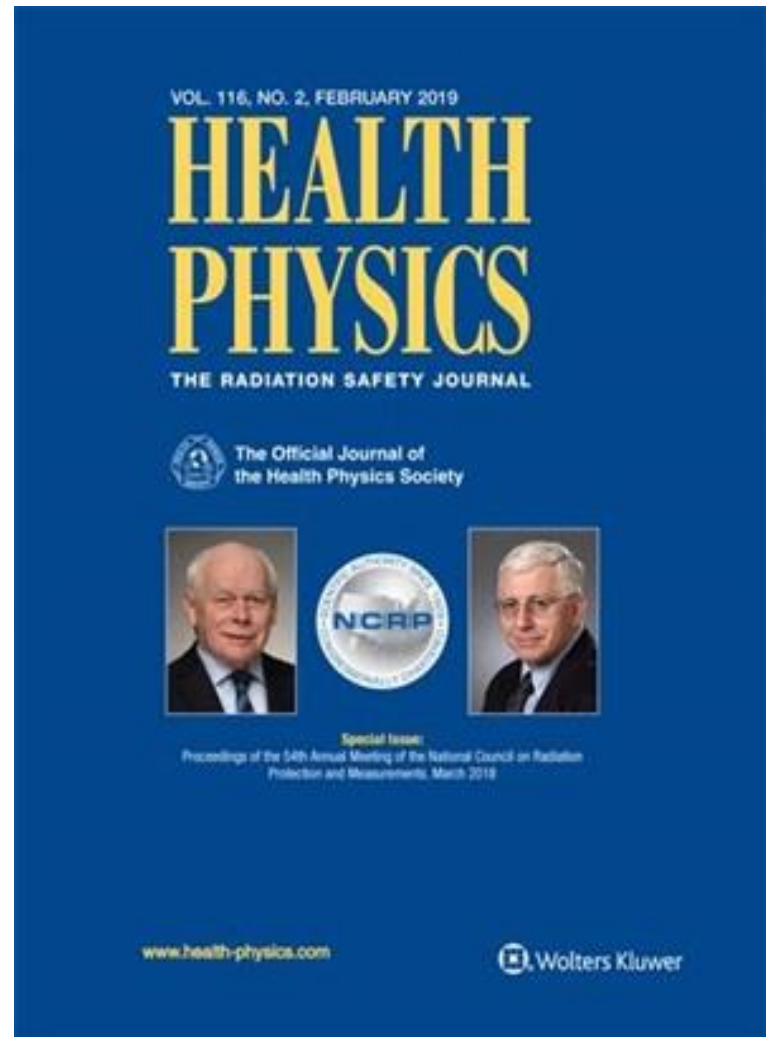
Fifty-Fourth
Annual Meeting Program

Radiation Protection
Responsibility in Medicine



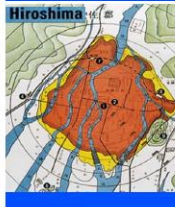
March 5–6, 2018

Hyatt Regency Bethesda
One Bethesda Metro Center
7400 Wisconsin Avenue
Bethesda, MD 20814





*Chair, Fred A. Mettler, Jr.
Co-Chairs, Jerrold T. Bushberg &
Richard J. Vetter*



Fifty-Fifth Annual Meeting Program

NCRP Meeting the Challenge at 90: Providing Best Answers to Your Most Pressing Questions About Radiation

April 1–2, 2019

Hyatt Regency Bethesda
One Bethesda Metro Center
7400 Wisconsin Avenue
Bethesda, MD 20814



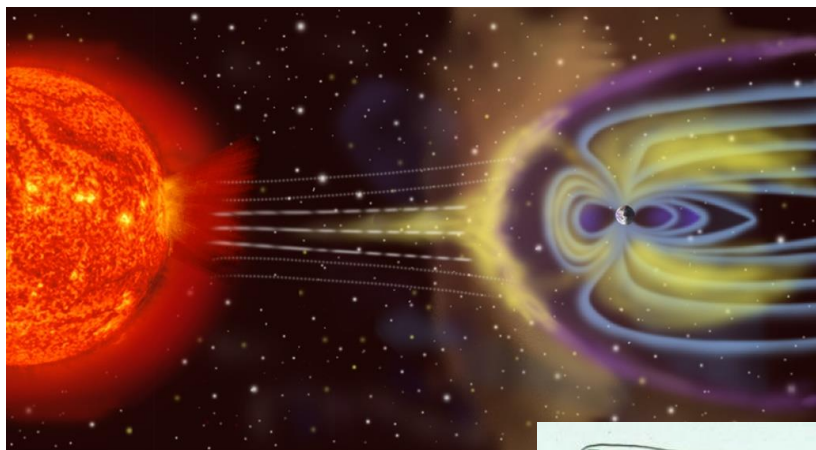


2020 Annual Meeting March 23-24, 2020

Radiation & Flight: A Down-to-Earth Look at Risks



Jacqueline P. Williams &
Cary Zeitlin, *Co-Chairs*





NCRP Partnerships and Participation in Meetings of Other Organizations



NCRP Active Partnerships

- Image Gently Alliance
- Conference of Radiation Control Program Directors
- Health Physics Society
- Radiation Research Society



One Size Does Not Fit All ...

There's no question – CT helps us save kids' lives! But... radiation matters! So, when we image, let's image gently.

More is often not better.
When CT is the right thing to do:

- Child size the kVp and mA
- One scan (single phase) is often enough
- Scan only the indicated area



image gently®

Visit www.imagegently.com



Partnering with International Organizations

ICRP INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

- Two Council Members are on the Main Commission
- NCRP is a Liaison Organization



Eight Council Members are on the U.S. Delegation to the United Nations Scientific Committees on the Effects of Atomic Radiation (UNSCEAR)



One Council Member is on the International Commission on Radiation Units and Measurements (ICRU)



NCRP Participation in Health Physics Society Mid-year Meetings



2016 – Austin
2017 – Bethesda
2018 – Denver
2019 – San Diego



2020: NCRP Symposium on Radiation
Protection in Medicine
HPS Mid-Year Meeting, 26–29 January
2020; Bethesda, MD



NCRP Conducts Health Effects Research – The Million Person Study



National Study of One Million U.S. Radiation Workers and Veterans



Robert Oppenheimer,
General Leslie Groves,
Enrico Fermi, Hans Bethe,
Theodore Hall

■ Manhattan Project	360,000
■ Atomic Veterans	115,000
■ Nuclear Utility Workers	150,000
■ Industrial Radiographers	115,000
■ Medical & other	>250,000

- **GAO** Report on Low Dose Radiation Needs, 2017
- Low-Dose Radiation Research Act of 2018 – **HR 4675**
- **HR 589** DOE OS “shall carry out a low-dose radiation research program” ...



Funding from DOE, DOD, NRC, NASA, CDC

Medical Radiation Workers – Focus on Sex Differences in Lung Cancer Risk

- Largest Individual Cohort – 170,000
- Half women, half men
- Radiologists, Nuclear Medicine, Oncologist, Technologists, Interventionalists
- Challenging Dosimetry

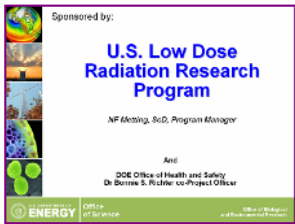
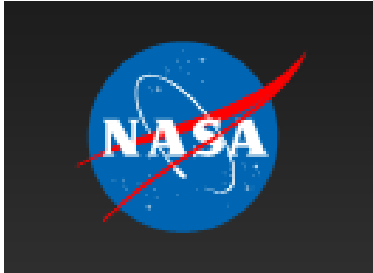


Study Population = 168,601

<u>DoseCat</u>	<u>N</u>	<u>Percent</u>
< 10 mSv	29,902	24.5
10 - < 50 mSv	77,150	25.2
50 - < 100 mSv	34,410	28.1
100 - < 500 mSv	25,376	20.8
500 - < 1000 mSv	1,247	1.0
1000 plus mSv	516	0.4



Federal Government Sponsors (Past & Present)





NORM/TENORM

- An activity emphasized in CDC grant to NCRP
- Commentary nearing completion: SC 5-2: Overview of NORM/TENORM from the Contemporary Oil and Gas Industry
- Underlying principles in NCRP Report No. 180



Report No. 180: Radiation Protection Guidance for the United States

NCRP REPORT No. 180

MANAGEMENT OF EXPOSURE TO IONIZING RADIATION: RADIATION PROTECTION GUIDANCE FOR THE UNITED STATES (2018)



National Council on Radiation Protection and Measurements

Council Committee (CC)-1



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G.E. Woloschak

J.E. Till, *Liaison*

S.J. Adelstein, *Consultant*

R.L. Anderson, *Consultant*

M. Boyd, *Consultant*

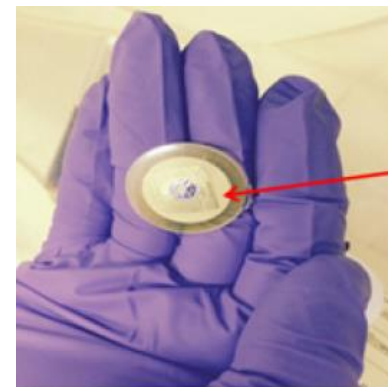
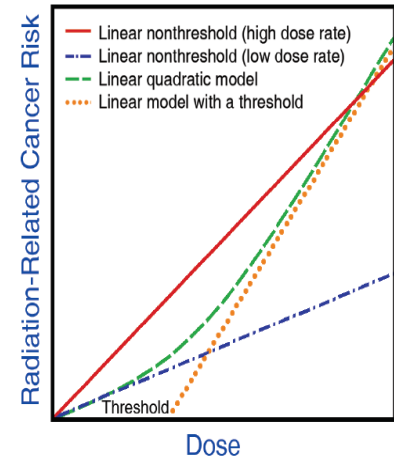
M. Rosenstein,

Staff Consultant

Thanks to NRC & CDC for financial support

NCRP Report No. 180

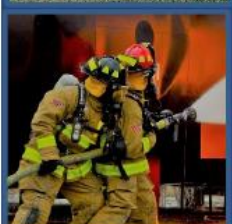
- Recommendations integrate:
 - Knowledge of human biological effects of ionizing radiation
 - Established ethical principles
 - Experience with use and management of radioactivity and radiation-producing devices
 - Experience with radiation protection approaches



NCRP Report No. 180



- Explicitly covers workers and members of the public who may be exposed to elevated levels of NORM/TENORM
- 3 Radiation Protection Principles
 - Justification
 - Optimization (ALARA)
 - Numeric protection criteria for management of dose to an individual
 - Only suitable to be a regulatory dose limit when the source is stable, characterized, and an appropriate radiation control program is established in advance





NCRP Report No. 180: Optimization

- ALARA, **taking into account societal, economic and environmental factors**
 - Maximizing benefit over harm
 - Not just driving doses lower and lower
- Applies to all exposure situations to manage doses well below numeric protection criteria
- Each situation, circumstance could be unique, so each outcome might be unique
- To be considered within “All Hazards”



SC 5-2: Radiation Protection for NORM & TENORM from Oil & Gas Recovery



WE Kennedy,
Chair



D Allard



M Barrie



P Egid



G Forsee



R Johnson



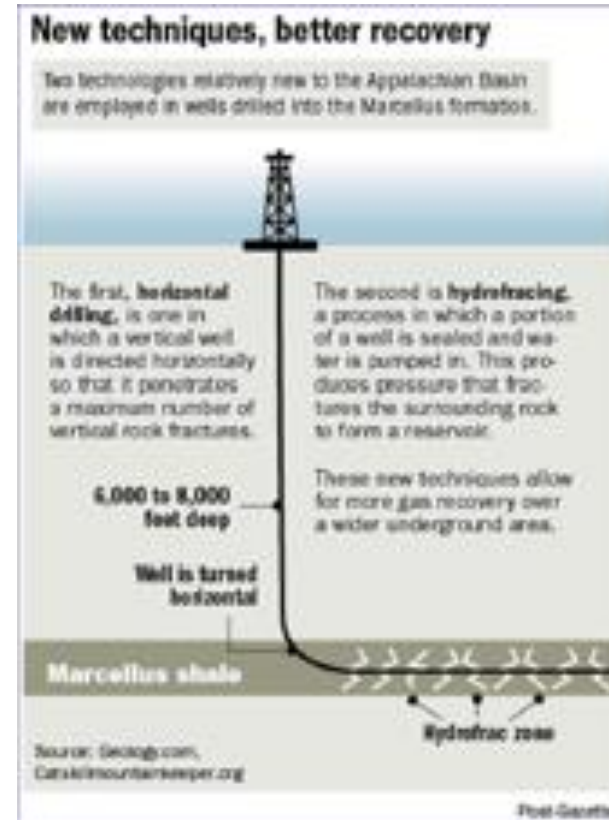
A Lombardo



R McBurney



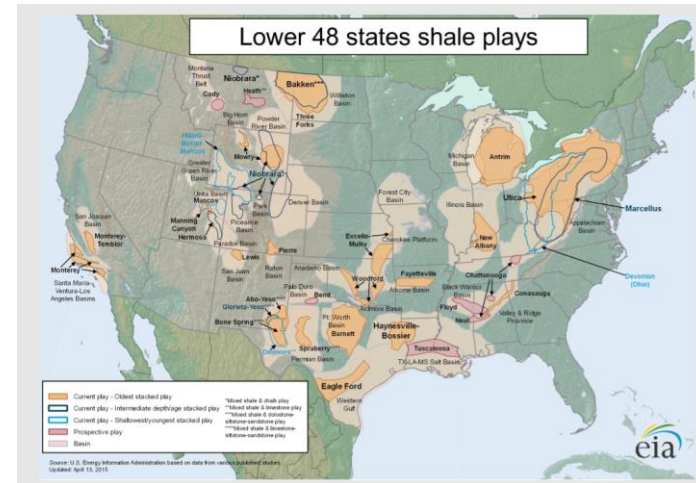
J Frazier



Thanks to CRCPD and CDC for financial support

SC 5-2: Background

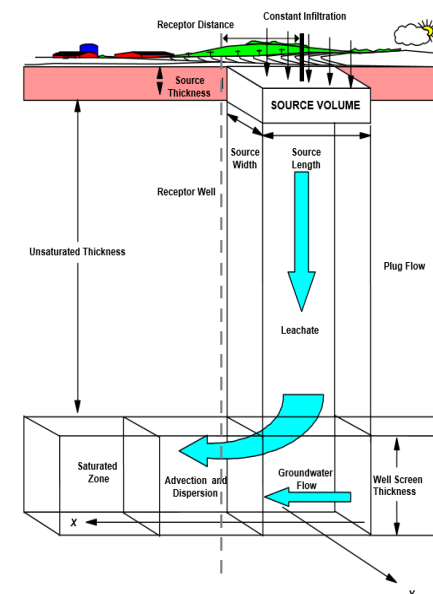
- New technologies like hydraulic fracturing and horizontal drilling (unconventional oil and gas exploration and production) are increasingly in use.
- NORM/TENORM regulation falls to the States, resulting in inconsistent regulations.
- **Purpose of SC 5-2:** Conduct a scientific evaluation of potential radiation protection and waste management issues from contemporary oil and gas exploration and production.





SC 5-2: Topics

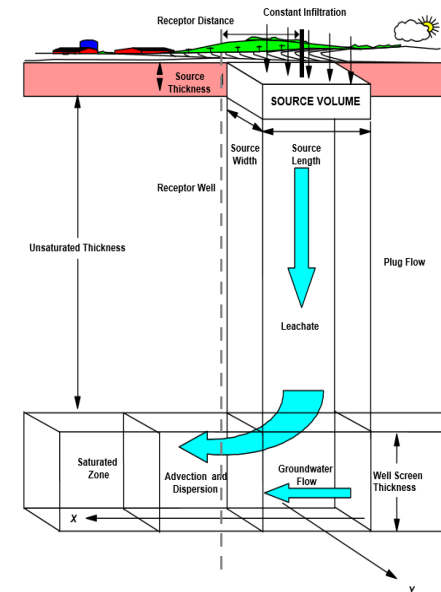
- Introduction: Need for Guidance
- Natural Background
- Oil and Gas Operations that Generate TENORM
- TENORM Management and Disposition Options
- Other Factors that May Affect TENORM Safety Decisions
- Historical and Current Regulatory Framework
- Disposal Modeling Considerations
- Legal Considerations
- Summary and Recommendations





NCRP SC 5-2

- More on NCRP Scientific Committee 5-2 to be presented by Bill Kennedy in Workshop sponsored by CRCPD and CDC on Wednesday, September 25, 1:30-5:00 pm





Summary

- NCRP chartered by US Congress to provide independent scientific advice on matters related to radiation protection and measurements.
- Numerous documents on topics such as dose to lens of the eye, nanotechnology, emergency preparedness, dosimetry for epidemiology, LNT and low dose effects, space radiation, medical radiation, etc.
- Other activities include annual meetings, research, partnerships with numerous organizations.
- NCRP's SC 5-2 is preparing a Commentary on "Overview of NORM/TENORM from the Contemporary Oil and Gas Industry".

