LIST OF CONTENTS
NUMBER 1 JULY

● EDITORS' PAGES

References 1
International System of Units 5

● SPECIAL REPORT

Possibilities and Limits for Applying the Concept of Collective Dose
A Recommendation of the Commission for Radiological Protection of the Federal Republic of Germany 9

● DISCUSSION PAPER—SCIENCE POLICY ISSUES

A Bayesian Analysis or Scientific Judgment of Uncertainties in Estimating Risk Due to \(^{222}\text{Rn}\) in U.S. Public Drinking Water Supplies
Douglas J. Crawford-Brown and C. Richard Cothern 11

● PAPERS

Radionuclide Content of and \(^{222}\text{Rn}\) Emanation from Building Materials Made from Phosphate Industry Waste Products

Calculation of the Estimated Collective Effective Dose Equivalent \((S_E)\) Due to x-ray Diagnostic Examinations—Estimate of the \(S_E\) in Finland
S. Rannikko, A. Servomaa, I. Ermakov, L. Masarskii, L. Saltukova, M. Razumnaya and V. Nikitin 31

Experimental and Computational Techniques for \(\beta\)-particle Dosimetry
Li Shen, Gary L. Catchen and Samuel H. Levine 37

An Optimized Computational Method for Determining the \(\beta\) Dose Distribution Using a Multiple-element Thermoluminescent Dosimeter System
Li Shen, Samuel H. Levine and Gary L. Catchen 49

A Comparison of ICRP Publication 30 Lung Model-based Predictions with Measured Bioassay Data for Airborne Natural \(\text{UO}_2\) Exposure
K. S. Thind 59

Measurement of Absorbed Dose in Water Irradiated by 2.5-GeV Bremsstrahlung
Syuichi Ban, Hideo Hirayama and Shigeyuki Miura 67

Comparative Uptake from Sea Water and Tissue Distribution of \(^{60}\text{Co}\) in Marine Mollusks
Fernando P. Carvalho 73

● NOTES

Radioactivity Measurements in Northwest Italy After Fallout from the Reactor Accident at Chernobyl
Some Measurements of the Equilibrium Factor for $^{222}$Rn Daughters in Houses  
R. E. Toohey, M. A. Essling, J. Rundo and Wang Hengde  

**CORRESPONDENCE**

Comments on Rn Emanation from Natural Deposits of U and Remedial Actions  
Albert J. Hazle  

**BOOK REVIEWS**

Reviewed by William R. Hendee  

*Alpha Counting and Spectrometry Using Liquid Scintillation Methods* by W. J. McDowell  
Reviewed by Michael T. Ryan  

Reviewed by Michael T. Gillin  

*NMR in Medicine: The Instrumentation and Clinical Applications* (Medical Physics Monograph No. 14), edited by Stephen R. Thomas and Robert L. Dixon  
Reviewed by William R. Hendee  

*Dosimetry and Clinical Uses of Afterloading Systems* (Report No. 45), edited by A. R. Alderson  
Reviewed by David S. Gooden  

**NEWS AND NOTICES**  

**HEALTH PHYSICS SOCIETY PROSPECTUS**  

**HEALTH PHYSICS SOCIETY AFFILIATES**  

**INSTRUCTIONS TO CONTRIBUTORS**  

**SOFTWARE SURVEY SECTION**  

LASER PRO  
WASTEMIX—For Calculation of Mixed Concentrations of H-3 and C-14 in Aqueous Waste  
Gamma Reference Package (GAMREF)  

**ADVERTISERS INDEX**  

Appears in the back of this issue  

**NUMBER 2 AUGUST**  

**PRESIDENT’S MESSAGE—1987**

A Wealth of Talent  
David A. Waite  

xvii
LIST OF CONTENTS

• OBITUARY

John Austin Victoreen (1902–1986)
Citation by Lauriston Taylor and Don Collins

• PAPERS

A Proposal for a Generally Applicable de minimis Dose
D. C. Kocher

Comparison of Risk Estimates Using Life-table Methods
R. E. Sullivan and Pao-Shan Weng

Electron Dose-rate Conversion Factors for External Exposure of the Skin from Uniformly Deposited Activity on the Body Surface
D. C. Kocher and K. F. Eckerman

A Simple Approximation for Estimating Centerline $\gamma$ Absorbed Dose Rates Due to a Continuous Gaussian Plume
Thomas J. Overcamp and Robert A. Fjeld

Absorption and Biokinetics of U in Rats Following an Oral Administration of Uranyl Nitrate Solution
Y. David La Touche, David L. Willis and Orysia I. Dawydiak

Monte Carlo Study of Electron Spectra Produced in Semi-infinite and Finite Water Phantoms Irradiated by Photons of Energies up to 2 MeV
L. N. Pandey, M. L. Rustgi and S. A. T. Long

• NOTES

Indoor and Outdoor $^{222}$Rn and $^{220}$Rn Daughters in Hong Kong
Man-yin W. Tso and Chung-chuen Li

Soil Water Effects on Concentration Profiles and Variations of $^{222}$Rn in a Vadose Zone
M. Fukui

The Effect of Ingested Mass on Pu Absorption in the Rat
J. D. Harrison and A. J. David

Photo-energy Calibration of $^6$LiI(Eu) Crystals in Mixed Radiation Fields Using $^{24}$Na
Rai-Ko S. Sun

• CORRESPONDENCE

An Interim Note About Applying the IRPA Pulsed Radiofrequency Guidelines
Gordon C. Miller

Comment on ‘Counting Losses in $\gamma$-ray Spectrometry Not Eliminated by Dead-time Correction Circuitry’
Ron LaVera

Reply to Comments on Counting Losses in $\gamma$-ray Spectrometry
Dale G. Olson
On the Comparison of Nuclear Track and Diffusion Barrier Charcoal Adsorption Methods for Measurement of $^{222}$Rn Levels in Indoor Air
H. W. Alter, R. A. Oswald and R. V. Wheeler 198

Reply to Comments about Measuring Indoor $^{222}$Rn Levels
Bernard L. Cohen 199

Comment on Prenatal x Rays and Cancers
G. W. Kneale 200

ERRATUM
Correction for: Seasonal Variation of Indoor Rn at a Location in the Southwestern United States, Health Phys. 51: 427-436; 1986 201

NEWS AND NOTICES 203

HEALTH PHYSICS SOCIETY PROSPECTUS 211

HEALTH PHYSICS SOCIETY AFFILIATES 213

INSTRUCTIONS TO CONTRIBUTORS 215

SOFTWARE SURVEY SECTION 1

ADVERTISER INDEX Appears in the back of this issue

NUMBER 3 SEPTEMBER

EDITORIAL
Focusing on Environmental Health Physics
Michael T. Ryan 217

PAPERS
Indoor $^{222}$Rn Measurements in the Region of Beijing, People’s Republic of China
Ren Tianshan, Lin Lianqing, Chen Zhipeng, Li Guiyuan and Chen Amin 219

Europium-152 Depth Profile of a Stone Bridge Pillar Exposed to the Hiroshima Atomic Bomb: $^{152}$Eu Activities for Analysis of the Neutron Spectrum
Hiromi Hasai, Kazuo Iwatani, Kiyoshi Shizuma, Masaharu Hoshi, Kenjiro Yokoro, Shozo Sawada, Toshiso Kosako and Hiroshige Morishima 227

A Method of Obtaining Neutron Dose and Dose Equivalent from Digital Measurements and Analysis of Recoil-particle Tracks
Wesley E. Bolch, J. E. Turner, R. N. Hamm, H. A. Wright and G. S. Hurst 241

The Impact of an Isotopic Effect on the Interpretation of Bioassay Data for Pu
M. T. Ryan and J. W. Poston 255

Concentrations of $\alpha$-emitting Isotopes of U and Th in Uranium Miners’ and Millers’ Tissues
Narayani P. Singh, David D. Bennett, McDonald E. Wrenn and Geno Saccomanno 261
<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shielding Requirements for Mammography</td>
<td>Douglas J. Simpkin</td>
<td>267</td>
</tr>
<tr>
<td>Radiation Stimulation during the Early Stationary Growth Phase in <em>Synechococcus lividus</em> and its Correlation with Photooxidative Stress Occurring before the Stationary Phase</td>
<td>Annie Conter, Dominique Dupouy, Christian Vincent and Hubert Planel</td>
<td>281</td>
</tr>
<tr>
<td>Fallout $^3$H Ingestion in Akita, Japan</td>
<td>Shun'ichi Hisamatsu, Yukio Takizawa, Touru Abe and Tei'ichi Katsumata</td>
<td>287</td>
</tr>
<tr>
<td>Calibration of a NaI Spectrometer in Dose Equivalent Quantities</td>
<td>C. Austerlitz, G. Drexler and P. Nette</td>
<td>295</td>
</tr>
<tr>
<td><em>NOTES</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EGARD: An Environmental $\gamma$-ray and $^{222}$Rn Detector</td>
<td>Mark L. Maiello and Naomi H. Harley</td>
<td>301</td>
</tr>
<tr>
<td>Radioactivity of the Atomic Spa at Podčetrtek, Slovenia, Yugoslavia</td>
<td>I. Kobal and A. Renier</td>
<td>307</td>
</tr>
<tr>
<td>Dose to Radiotherapy Technologists from Activation of Patients at a Fast Neutron Therapy Facility</td>
<td>M. Tatcher, I. Rosenberg and J. G. Couch</td>
<td>311</td>
</tr>
<tr>
<td>Decay Rate of $\gamma$ Radiation from Nuclear Weapons Fallout</td>
<td>Carsten M. Haaland</td>
<td>313</td>
</tr>
<tr>
<td>Survey of Static Magnetic Fields around Magnetic Resonance Imaging Devices</td>
<td>Maria A. Stuchly and David W. Lecuyer</td>
<td>321</td>
</tr>
<tr>
<td>Preparation of $^3$H-free Water</td>
<td>John K. Sutherland</td>
<td>325</td>
</tr>
<tr>
<td>Comments on the Editorial about Radiofrequency Standards by D. H. Sliney, M. L. Wolbarsht and A. M. Muc</td>
<td>John M. Osepchuk</td>
<td>327</td>
</tr>
<tr>
<td>Effects of Dietary K on the Absorption and Excretion of Radiocesium in the Rat</td>
<td>D. Behne and H. Geßner</td>
<td>331</td>
</tr>
<tr>
<td><em>CORRESPONDENCE</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two Recent Breakthroughs</td>
<td>Irwin D. Bross and Neal S. Bross</td>
<td>333</td>
</tr>
<tr>
<td><em>NEWS AND NOTICES</em></td>
<td></td>
<td>335</td>
</tr>
<tr>
<td><em>HEALTH PHYSICS SOCIETY PROSPECTUS</em></td>
<td></td>
<td>343</td>
</tr>
<tr>
<td><em>HEALTH PHYSICS SOCIETY AFFILIATES</em></td>
<td></td>
<td>345</td>
</tr>
</tbody>
</table>
LIST OF CONTENTS

- INSTRUCTIONS TO CONTRIBUTORS 347
- SOFTWARE SURVEY SECTION 1
- ADVERTISER INDEX

Appears in the back of this issue

NUMBER 4 OCTOBER

- EDITORIAL

The Expanding Power Reactor Community
Sandra Karpen Hughes 349

- PAPERS

Effective Removal of Airborne $^{222}$Rn Decay Products Inside Buildings
Edward F. Maher, Stephen N. Rudnick and Dade W. Moeller 351

The Daily Intake of $^{234,235,238}$U, $^{228,230,232}$Th and $^{226,228}$Ra by New York City Residents
Isabel M. Fisenne, Pamela M. Perry, Karin M. Decker and Helen W. Keller 357

Inhalation Deposition and Retention Patterns of a U-Pu Chain Aggregate Aerosol
J. K. Briant and C. L. Sanders 365

Effect of Wet and Dry Cycles on Dissolution of Relatively Insoluble Particles Containing Pu
J. A. Mewhinney, A. F. Eidson and V. A. Wong 377

Biological Concentration of $^3$H
A. Alan Moghissi, E. W. Bretthauer and R. G. Patzer 385

Bioaccumulation Factor for $^{32}$P Measured in Bluegill, *Lepomis macrochirus,* and Catfish, *Ictalurus punctatus*
Bernd Kahn, Kristin S. Turgeon, David K. Martini, Susan J. Dunkerly, Rifaat M. K. El-Shinawy and Marcia D. Wilson 389

Angular Dependence of Shallow Dose from Energetic Electrons
J. L. Alvarez 397

- NOTES

External Dose to a Japanese Tourist from the Chernobyl Reactor Accident
Toshiyuki Nakajima 405

Comparison of Purchased Measurements with Measurements in Randomly Selected Houses as a Source of Information on $^{222}$Rn Levels in Houses
Bernard L. Cohen and Patrick Pondy 409

Nondestructive Determination of Selected U- and Th-series Radionuclides in Biological Samples
S. R. Joshi 417

Wt? No? ri? ali
Hub. Wijker 421
LIST OF CONTENTS

• CORRESPONDENCE

The Moyer Model and Hadron Transport Calculations
Ralph H. Thomas 425

• IRPA ABSTRACTS

Selected Abstracts of Papers Presented at the Eleventh Annual Conference of the Australian Radiation Protection Society, 20–22 August 1986, Sydney, Australia 427

• ERRATUM

Correction for: Neutron Dosimetry in the Containment of a Pressurized Water Reactor Using a Neutron-sensitive $\beta/\gamma$ Dosimetry System. Health Phys. 50:761–768. 431

• NEWS AND NOTICES

433

• HEALTH PHYSICS SOCIETY PROSPECTUS

441

• HEALTH PHYSICS SOCIETY AFFILIATES

443

• INSTRUCTIONS TO CONTRIBUTORS

445

• SOFTWARE SURVEY SECTION

Appears in the back of this issue 1

• ADVERTISER INDEX


NUMBER 5 NOVEMBER

• PAPERS

Measurement Uncertainties of Long-term $^{222}$Rn Averages at Environmental Levels Using $\alpha$ Track Detectors
Roger A. Nelson 447

Determining $^{222}$Rn Diffusion Lengths in Soils and Sediments
Jens Søgaard-Hansen and Anders Damkjær 455

Aerodynamic Size Associations of $^{212}$Pb and $^{214}$Pb in Ambient Aerosols
C. Papastefanou and E. A. Bondietti 461

An Improved Environmental Pathway Model for Assessing High-level Waste Repository Risks
Carl M. Malbrain and Richard K. Lester 473

Comparison of Estimates of Systemic Pu from Urinary Excretion with Estimates from Post-mortem Tissue Analysis
Ronald L. Kathren, Kenneth R. Heid and Margery J. Swint 487

Dosimetry of $\alpha$-emitting Radionuclides in Bone—A Practical Approach
W. Sontag 495

Estimate of Lifetime Dose in Persons Exposed Occupationally to x Rays in Poland
J. Jankowski, J. Liniecki, P. Swiderski and J. Głombiński 503
Altitude Variation of Cosmic-ray Neutrons
T. Nakamura, Y. Uwamino, T. Ohkubo and A. Hara

NOTES

Atmospheric Radioactivity in Valencia, Spain, Due to the Chernobyl Reactor Accident

Radon-222 Flux Density Measurements Using an Accumulator: An Alternative Technique
P. D. Kearney and D. A. Krueger

A Histological Study of the Influence of Cigarette Smoking in Suppressing Rn Daughter Carcinogenesis in Dogs
R. A. Gies, F. T. Cross and G. E. Dagle

A Simple Parameterization for Quality Factor as a Function of Linear Energy Transfer
Lawrence W. Townsend, John Wilson and Francis A. Cucinotta

Fallout 241Am in Human Livers from the Federal Republic of Germany
K. Bunzl, K. Henrichs and W. Kracke

A Personal Computer Access Control System for Radioisotope Laboratories
Kunihide Nishizawa and Takayuki Ozawa

Health Care Workers’ Perceptions of Risks
Charles A. Kelsey, Fred A. Mettler Jr., James A. Sorenson and Byron G. Brogdon

CORRESPONDENCE

Comments on ‘Effects of Continuous Low-level Exposure to Radiofrequency Radiation on Intrauterine Development in Rats’
Shin-Tsu Lu and Sol M. Michaelson

Reply to Lu and Michaelson Regarding Effects of Continuous Low-level Exposure to Radiofrequency Radiation
Santi Tofani, Giovanni Agnesod, Piero Ossola, Sergio Ferrini and Rita Bussi

Comments on ‘Assessing the Risks of Rn Exposure: The Influence of Cigarette Smoking’
Duncan C. Thomas

Comments on ‘A Survey Instrument Design for Accurate β Dosimetry’
R. E. Sorber

BOOK REVIEWS

Introduction to Radiological Physics and Radiation Dosimetry by Frank Herbert Attix
Reviewed by Joseph A. Sayeg

Managing Nuclear Operations, edited by Ashton B. Carter, John D. Stejnbruner and Charles A. Zraket
Reviewed by Ralph H. Thomas

Reviewed by Anthony R. Benedetto

NEWS AND NOTICES

HEALTH PHYSICS SOCIETY PROSPECTUS
LIST OF CONTENTS

• HEALTH PHYSICS SOCIETY AFFILIATES 561
• INSTRUCTIONS TO CONTRIBUTORS 563
• SOFTWARE SURVEY SECTION 1
• ADVERTISER INDEX Appears in the back of this issue

NUMBER 6 DECEMBER

• EDITORIAL

Writing Book Reviews
William R. Hendee 565

• SPECIAL SECTION: NON-IONIZING RADIATION

Preface. A Review of Non-ionizing Radiation Research
James M. Smith 567

Dosimetry Associated with Exposure to Non-ionizing Radiation: Very Low Frequency to Microwaves
Arthur W. Guy 569

Interaction of Extremely Low Frequency Electric and Magnetic Fields with Humans
T. S. Tenforde and W. T. Kaune 585

Radiofrequency Radiation Activities and Issues: A 1986 Perspective
Joe A. Elder 607

• PAPERS

Forecasting Radiation Rates and Exposure from Multi-aged Fallout
Carsten M. Haaland 613

Patient and Personnel Exposure during Extracorporeal Lithotripsy
Sharon Glaze, Adrian D. LeBlanc, Stewart C. Bushong and Donald P. Griffith 623

The Use of Teflon-embedded Calcium Sulphate: Dysprosium Thermoluminescent Dosimeters for Chest Radiography
Cari Borrás, Margaret M. Liss, Cindy Thomason, Oscar Hidalgo-Salvatierra, Cheryl P. White and John E. Barton 631

Measured Statistics of Laser Beam Scintillation in Strong Refractive Turbulence Relevant to Eye Safety
R. J. Hill, J. H. Churnside and D. H. Sliney 639

Proposed Revision of the Canadian Recommendations on Radiofrequency-exposure Protection
M. A. Stuchly 649

Does Tributyl Phosphate Influence the Radiation Risk of a Highly Proliferating System—the Early Mouse Embryo in vitro?
W.-U. Müller, C. Streffer and L. Markoski 667

Assessing Dose Equivalent from Intensive Short-term U Product Inhalation
Jiri Kvasnicka 673
LIST OF CONTENTS

• NOTES

Influence of Ore Type and Milling Process on 222Rn Emanation Coefficients of U Mill Tailings
Edward R. Landa

Measurement of the Transfer Coefficient for Radiocesium Transport from a Sheep's Diet to its Milk
P. A. Assimakopoulos, K. G. Ioannides and A. A. Pakou and A. Mantzios

• CORRESPONDENCE

Questions about Chernobyl
Y. Ujeno

• BOOK REVIEWS

John T. Lett and Kurt I. Altman
Reviewed by Max L. Baker

Environmental Radioactivity by Merrill Eisenbud
Reviewed by Michael H. Raudenbush

• NEWS AND NOTICES

• HEALTH PHYSICS SOCIETY PROSPECTUS

• HEALTH PHYSICS SOCIETY AFFILIATE MEMBERS

• INSTRUCTIONS TO CONTRIBUTORS

• LIST OF 1986–87 JOURNAL REVIEWERS

• LIST OF CONTENTS FOR VOL. 53

• AUTHOR INDEX FOR VOL. 53

• SUBJECT INDEX FOR VOL. 53

• NEW PATENTS SECTION

New patents and published patent applications from the United States and over 30 other countries

• SOFTWARE SURVEY SECTION

A63-BI “MAESTRO”™ MULTICHANNEL ANALYSER SOFTWARE
Source Inventory and Control System

KIRSTY: A Package for the Estimation of X-ray Dose Received by the Fetus

A25-BI, SCINPLEX™ Gamma-Ray Analysis Software for Multiple NaI Detectors

MPC-TRAK

• ADVERTISER INDEX

Appears in the back of this issue
POSSIBILITIES AND LIMITS FOR APPLYING THE CONCEPT
OF COLLECTIVE DOSE
A Recommendation of the Commission for Radiological Protection
of the Federal Republic of Germany
Prepared by a Task Group

A. Kaul, Chairman
Institut für Strahlenhygiene, Ingolstädter Landstraße 1, D-8042 Neuherberg

K. Aurand
Bundesgesundheitsamt, Thiellallee 88-92, D-1000 Berlin 33

H. Bonka
Lehrstuhl für Reaktortechnik der Rheinisch-Westfälischen Technischen Hochschule Aachen,
Eilfschornsteinstraße, D-5100 Aachen

D. Gumprecht
Gesellschaft für Reaktorsicherheit, Schwertnergasse 1, D-5000 Köln

D. Harder
Institut für Medizinische Physik und Biophysik, Universität Göttingen, Gosslerstraße 10, D-3400 Göttingen

H. J. Hardt
Bundesminister für Umwelt, Naturschutz und Reaktorsicherheit, Postfach 120 629, D-5300 Bonn 1

W. Jacobi
Gesellschaft für Strahlen- und Umweltforschung mbH, Ingolstädter Landstraße 1, D-8042 Neuherberg

A. M. Kellerer
Institut für Medizinische Strahlenkunde der Universität Würzburg, Versbacher Landstraße 5, D-8700 Würzburg

H.-H. Landfermann
Bundesminister für Umwelt, Naturschutz und Reaktorsicherheit, Postfach 120 629, D-5300 Bonn 1

E. Oberhausen
Radiologische Universitätsklinik, Abteilung für Nuklearmedizin, D-6650 Homburg (Saar)

C. Streffer
Universitätsklinikum der Gesamthochschule Essen, Institut für Medizinische Strahlenphysik,
Hufelandstraße 55, D-4300 Essen 1

(Received 5 November 1985; accepted 20 January 1987)

BESIDES the protection of individuals, radiation protection
is concerned with the detection and reduction of the radia-
tion exposure of groups of occupationally exposed
persons and groups of the general public. The resulting
task is the definition, for supervisory and optimization
purposes, of the appropriate characteristics of the radiation
exposure of such a group of persons. This definition should consider not only the doses to individuals but also the number of exposed persons.

From a statistical point of view, either (a) the statement of the distribution of the number of persons to the various classes of doses (with an appropriate selection of class boundaries) or (b) already a greatly simplified concept—the statement of the number of persons and of the mean dose could be used; and (c) as an even more simplified measure of total exposure, the "collective dose" offers itself, which is defined as the product of the number of persons exposed and the arithmetic mean of all doses which occur.

In a recommendation published in detail elsewhere (Ka86), the Commission for Radiological Protection of the Federal Republic of Germany investigated the problem whether, and if so, under what conditions the “collective dose” characteristic is a meaningful measure of the radiation exposure of an exposed group of persons. In particular, the investigation was to determine whether the collective dose is suitable as (i) a measure of the radiation-related "detriment" and (ii) a tool for the optimization of radiation protection and for the comparison of safeguards, and thus proves to be a meaningful measure of exposure. This investigation was carried out considering both the scientific state of the art and the prevailing legal situation in the Federal Republic of Germany.

Furthermore, the aim was to determine whether other methods are available for a meaningful characterization of the radiation exposure of groups of the population.

On the basis of a comprehensive analysis, the Commission obtained the following results:

(1) The collective dose is suitable to serve as an absolute measure of the collective detriment only if there is a sufficient knowledge of the risk coefficients required for the calculation of detriment in the dose range to be studied. For the relevant dose ranges in practical radiation protection, it has to be emphasized that the risk coefficients are derived from epidemiological data at relatively high doses. Their extrapolation to low doses is based on the assumption of a linear dose-risk relationship without a threshold.

(2) Under certain conditions, the collective dose can be used to estimate the relative ratio of detriments from different sources or practices. This is particularly valid if the doses from these sources are small compared with the natural radiation dose and if the latter has similar values for persons exposed to the different sources or practices. Under these conditions the ratio of detriments is nearly equal to the corresponding ratio of the collective doses from different sources or practices, independent of the shape of the dose-risk relationship.

(3) With respect to radiation workers, particularly in nuclear facilities, the German Radiation Protection Commission considers the collective dose to be a suitable quantity for the optimization of the occupational radiation protection. It can be used to compare the efficiency of different working procedures and protective measures and for the selection of such procedures and measures which lead to a minimization of the collective dose on the basis of the ALARA (as low as reasonably achievable) principle.

(4) In accordance with the present state of the art, the International Commission on Radiological Protection (ICRP) proposal of an optimization on the basis of a cost-benefit analysis cannot be a subject of legal regulations, because of an insufficient knowledge of monetary values for the radiation-induced detriment. The minimization procedure already developed in the past, i.e., for the improvement of effluent-reducing techniques as well as the establishment of authorized individual dose limits and effluent limits, have proved their worth in the radiation protection of the population.

(5) If statistical characteristics for the radiation exposure of the population are required, it seems more appropriate to estimate the size of population groups in different dose cohorts. However, the size of the group of the population that is exposed to less than 3 μSv per year should not be considered a meaningful parameter for the purposes of optimization and decision-making. This value is far below the range of variation of natural radiation exposure and amounts to 1% of the authorized dose limit of 0.3 mSv per year that is valid in the Federal Republic of Germany for the exposure of members of the public to artificial sources, except medical exposure.

The group of the population receiving an effective dose equivalent above 3 μSv per year is considered to be the group which should primarily be regarded for accounting and comparative purposes concerning radiation protection measures. Thus, it is a meaningful approach to state the size of this group and possibly the arithmetic mean of the effective dose in this group. In special cases, it may be appropriate to introduce further class boundaries.

REFERENCES