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July 23, 1999

Ms. Mary Thomas  
 U.S. Nuclear Regulatory Commission  
 Office of Nuclear Regulatory Research  
 Mail Stop T-9C24  
 Washington, DC 20555

Re: Grant No. NRC 04 98 052

Dear Ms. Thomas:

Enclosed is a copy of a Comprehensive Technical Progress Report for all NCRP committees for the period of January 1, 1999 through March 31, 1999. Included in this report is a summary of the status of the projects covered by NRC Grant No. NRC 04 98 052. Also enclosed is a copy of NCRP Report No. 129, *Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies*, which was published during this reporting period.

If you have any questions regarding this report, please contact Dr. Thomas Koval at (301) 657-2652.

Sincerely,



William M. Beckner  
 Executive Director

TMK/lja  
 Enclosures  
 cc: Ms. Mary Mace, Grants Officer  
 T.M. Koval  
 C.B. Meinhold  
 NRC Grant File



## COMPREHENSIVE TECHNICAL PROGRESS REPORT

January 1, 1999 to March 31, 1999

Some NCRP scientific committees are not supported by a dedicated source of funding. Therefore, the progress of these scientific committees is often less than desired, since only minimal funds from donations or non-targeted sources are available to support these committees. Funding sources interested in seeing the work of any of these committees coming to completion in a more timely manner should contact William M. Beckner (telephone: 301-657-2652 or e-mail: ncrpexec@ncrp.com) for information on schedule of work and cost. These committees are identified by an asterisk (\*) in this report.

### Basic Criteria, Epidemiology, Radiobiology, and Risk

Scientific Committee 1 functions as the scientific program area committee for Basic Criteria, Epidemiology, Radiobiology, and Risk. Within the scope of this Committee are four active report-writing committees: Scientific Committee 1-4 on *Extrapolation of Risks from Non-Human Experimental Systems to Man*, Scientific Committee 1-6 on *Linearity of Dose Response*, Scientific Committee 1-7 on *Information Needed to Make Radiation Protection Recommendations for Travel Beyond Low-Earth Orbit*, and Scientific Committee 1-8 on *Risk to Thyroid from Ionizing Radiation*.

Currently authorized but unfunded activities within this program area are:

- *Lung Cancer Risks from Inhaled Radionuclides*

In collaboration with Scientific Committee 46, Scientific Committee 1 has continued its efforts to generate an NCRP Statement on the ALARA principle. The objective of this effort is to provide guidance helpful to managers of radiation protection programs to avoid excessive costs associated with unreasonable dose reduction efforts. This Statement has been reviewed by the Council members and is currently being revised following Council review. The Committee has also continued its examination of the rationale used to select dose limits. At its most recent meeting, the Committee met with representatives of the U.S. Environmental Protection Agency to discuss their strategy and philosophy for promulgating standards for radiation and other carcinogens.

The membership of Scientific Committee 1 is as follows:

S.J. Adelstein, Chairman  
B.B. Boecker  
R.J.M. Fry  
R.A. Guilmette  
E.J. Hall  
K.R. Kase  
J.B. Little  
H.D. Royal  
R.E. Shore  
P. Slovic  
T.S. Tenforde

F.W. Whicker  
W.K. Sinclair, Advisor  
E.E. Kearsley, NCRP Staff

Scientific Committee 1-4 is addressing the *Extrapolation of Risks from Non-Human Experimental Systems to Man*. This is to be an in-depth evaluation of the types of cancers that are associated with radiation exposure in various animals, their lifetime risks, and the methodology that might be used to extrapolate these risks to humans. A complete draft report has been assembled and is currently undergoing revision following a meeting held on February 17-18, 1999 to settle remaining issues and finalize the draft. The draft report is expected to enter the NCRP review process later in 1999.

The Membership of Scientific Committee 1-4 is as follows:

D. Hoel, Chairman  
B.A. Carnes  
R.L. Dedrick  
D. Grahn  
W.C. Griffith  
P. Groer  
R.J. Preston  
R.J.M. Fry, Advisor  
T.M. Koval, NCRP Staff

Scientific Committee 1-6\* on *Linearity of Dose Response* was established to make a critical examination of the scientific basis for the assumption of linearity of the human dose response curve for carcinogenesis in the region of low doses and dose rates. The Council members have completed their review of the Committee's efforts and a revised text is being prepared.

The membership of Scientific Committee 1-6\* is as follows:

A.C. Upton, Chairman  
S.J. Adelstein  
D. Brenner  
K.H. Clifton  
S.C. Finch  
E.J. Hall  
H.L. Liber  
R.B. Painter  
R.J. Preston  
R.E. Shore  
A. Kronenberg, Advisor  
E.E. Kearsley, NCRP Staff

Scientific Committee 1-7 on *Information Needed to Make Radiation Protection Recommendations for Travel Beyond Low-Earth Orbit* is identifying specific research that needs to be performed to acquire the data necessary to make radiation protection

recommendations for humans working in deep space. The Committee met on January 14-15, 1999 and continued to refine research recommendations and the supporting text.

The membership of Scientific Committee 1-7 is as follows:

L.W. Townsend, Chairman  
G.D. Badhwar  
E.A. Blakely  
L.A. Braby  
F.A. Cucinotta  
S.B. Curtis  
C.E. Land  
D.F. Smart  
R.J.M. Fry, Advisor  
E.E. Kearsley, NCRP Staff

Scientific Committee 1-8 on *Risk to Thyroid from Ionizing Radiation* is concerned with incidence and mortality risks from external irradiation and radioiodine exposures of the thyroid. The Committee's draft will review dosimetry, molecular biology, animal studies, human epidemiology, and modeling in addressing risk for adults and children, as well as medical evaluation and screening. The first meeting of the Committee was held at NCRP headquarters in Bethesda, Maryland on April 23, 1997. The Committee discussed its charge and the scope of the drafting effort. A second meeting was held on August 22, 1997. The Committee developed a working outline and initial drafting assignments were made. Additional meetings were held on January 9, April 24, August 28, November 17, 1998, and March 5, 1999 where discussions continued and draft material was reviewed. The next meeting is scheduled for May 21, 1999.

The membership of Scientific Committee 1-8 is as follows:

H.D. Royal, Chairman  
D. Becker  
A.B. Brill  
R.E. Shore  
R.M. Tuttle  
B.W. Wachholz  
D.A. Weber  
P.D. Zanzonico  
E. Ron, Advisor  
X. Xu, Consultant  
T.M. Koval, NCRP Staff

Scientific Committee 9 on *Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies up to 10 MeV* has essentially completed a draft report entitled *Structural Shielding For Diagnostic Medical X Ray Facilities*. The draft report has an extensive section on Fundamentals of Diagnostic X-Ray Shielding, a section on Elements of Shielding Design and, perhaps the most important section, Computation of Diagnostic X-Ray Shielding Requirements. The final section of the report is

on Radiation Protection Surveys. The Executive Summary and a few details in the Radiation Protection Surveys section remain to be completed. The report will contain a Glossary and several Appendices. There are no further meetings planned for the Committee. The Co-Chairmen are working to complete the report and enter it into the NCRP system for review in 1999.

The membership of Scientific Committee 9 is as follows:

B. Archer, Co-Chairman  
J.E. Gray, Co-Chairman  
R.L. Dixon  
W. Eide, Jr.  
L. Hubbard  
R.M. Quillin  
D. Shearer  
D.J. Simpkin  
A.K. Poznanski, Consultant  
E.E. Kearsley, NCRP Staff

### Operational Radiation Safety

Scientific Committee 46\* is the NCRP scientific program area committee concerned with *Operational Radiation Safety*. The Committee is actively engaged in preparing scope statements for future projects to be submitted for funding.

Currently authorized but unfunded activities within this program area are:

- *Air Monitoring*
- *Design of Facilities and Installed Equipment for Handling Unsealed Radioactive Materials*
- *Design Guidelines for Nuclear Medicine Facilities*
- *Radiation Exposures Resulting from Air Travel*
- *Radiation Protection Guidelines for Industrial Accelerators and Irradiators*
- *Radiation Protection in Biomedical / Biological Research*
- *Revised Guidance on Radiation Protection in Veterinary Medicine*
- *Investigation of Radiological Incidents*
- *Self-Assessment of Radiation Safety Program*

The Committee has identified many new efforts for which the members are drafting statements of work to be submitted to the NCRP Board of Directors. These include: Balancing Worker Risks and Public Safety in Environmental Remediation, Determining Effective Dose Equivalent from Personal Dosimetry Measurements, and Safe Use of Radiation Sources for Gauging. The Committee is currently working on a revision to NCRP Report No. 71, *Operational Radiation Safety Training* and planning a revision to NCRP Report No. 36, *Radiation Protection in Veterinary Medicine*. During this quarter, the Committee reviewed and approved the text of the revised ALARA statement that was then sent to the Council membership for their second review. The Committee met January 28-29, 1999 and discussed the following items: status of draft scopes of work, the Scientific Vice President's meeting that had been held on January 7-8, 1999, and began revising NCRP Report No. 71.

Functioning within the scope of this Committee are four report-writing committees: Scientific Committee 46-8\* on *Radiation Protection and Design Guidelines for Particle Accelerator Facilities*, Scientific Committee 46-10\* on *Assessment of Occupational Doses from Internal Emitters*, Scientific Committee 46-11\* on *Radiation Protection During Special Medical Procedures*, and Scientific Committee 46-13\* on *Design of Facilities for Medical Radiation Therapy*.

The membership of Scientific Committee 46\* is as follows:

K.R. Kase, Chairman  
J.W. Baum  
J.P. Davis  
S.M. Garry  
D.C. Hall  
K.A. Higley  
S.M. Langhorst  
K.L. Miller  
D.S. Myers  
J.W. Poston, Sr.  
P.G. Voillequé  
L.A. Fairobent, NCRP Staff

Scientific Committee 46-8\* on *Radiation Protection Design Guidelines for Particle Accelerator Facilities* has prepared a draft report which is currently being revised for review by the NCRP Council members. This report will be a complete stand-alone revision of NCRP Report No. 51 which was published in 1977. By "stand alone" it is meant that all pertinent reference material is included in the new text. The draft report is expected to be ready for Council review in 1999.

The membership of Scientific Committee 46-8\* is as follows:

R.H. Thomas, Chairman  
W.R. Casey  
J.D. Cossairt  
K. O'Brien  
N. Rohrig  
L.A. Slaback  
G. Stapleton  
D.R. Perry, Advisor  
C.J. Maletskos, NCRP Staff

Scientific Committee 46-10\* on *Assessment of Occupational Doses from Internal Emitters* has a draft report that has been revised significantly following initial review by the Council members. The report addresses two major issues of importance to the assessment of internal dose. First, the draft report provides additional guidance for interpreting bioassay measurements and estimating intakes. Second, the draft report addresses problems that have arisen as a result of the evolution of radiation protection

quantities and units that have been introduced in recent years. The revised report is expected to be forwarded to the Council membership for a second review due to the many changes that have been incorporated into the present draft.

The membership of Scientific Committee 46-10\* is as follows:

D.R. Fisher, Chairman  
A.R. Benedetto  
C.D. Berger  
J.W. Poston, Sr.  
K.W. Skrable  
D. Myers, Liaison  
L.A. Fairbent, NCRP Staff

The draft report of Scientific Committee 46-11\* on *Radiation Protection During Special Medical Procedures* has produced a draft report entitled *Radiation Protection of Clinical Staff in Special Medical Procedures*. This Report is being revised following Council review.

The membership of Scientific Committee 46-11\* is as follows:

D.R. Shearer, Chairman  
L.F. Brateman  
D.P. Harrington  
M.E. Masterson  
R.C. Murry  
L.A. Fairbent, NCRP Staff

Scientific Committee 46-13\* on *Design of Facilities for Medical Radiation Therapy* meets together annually and by teleconference monthly. The need for this Committee arose when Scientific Committee 9, charged to rewrite NCRP Report No. 49, *Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies Up to 10 MeV* made the decision to limit their report to diagnostic x-ray facilities. This left the design of medical radiation therapy facilities to be covered by this Committee. In order to do their job completely it was necessary that they rewrite the pertinent parts of NCRP Reports 49, 51 and 79 and consolidate them into a single therapy shielding document. They are making steady progress and are involving the medical physics and health physics communities in the process.

The membership of Scientific Committee 46-13\* is as follows:

J.A. Deye, Chairman  
R.K. Wu, Vice Chairman  
P.J. Biggs  
J. Kleck  
R.C. McCall

P.H. McGinley  
J.E. Rodgers  
M. Edwards, SC 91 Liaison  
K. Kase, SC 46 Liaison  
E.E. Kearsley, NCRP Staff

Scientific Committee 46-14 is addressing *Radiation Protection Issues Related to Terrorist Activities that Result in the Dispersal of Radioactive Material*. At its initial meeting in November 1998, the Committee completed a working outline of the report and initial writing assignments were made. Subsequent to that, the Committee generated a more detailed outline by mail. During the last quarter, the Committee met twice and was briefed by representatives from the FBI, DOE, the Defense Nuclear Weapons School, and Texas Task Force 1.

The membership of Scientific Committee 46-14 is as follows:

J.W. Poston, Sr., Chairman  
C. Abdelnour  
E.J. Ainsworth  
S.M. Becker  
R.L. Brittigan  
I. Hamilton  
E.E. Hickey  
D.A. Kelm  
F.A. Mettler, Jr.  
J.M. Thompson  
M.C. Wrobel  
E.E. Kearsley, NCRP Staff

#### Dosimetry and Metabolism of Radionuclides

Scientific Committee 57-10\* on *Liver Cancer Risk* is evaluating the risk to the liver from internal emitters and a draft report is currently undergoing review by the Council members as well as critical reviewers with expertise in the area.

The membership of Scientific Committee 57-10\* is as follows:

A.L. Brooks, Co-Chairman  
G.N. Taylor, Co-Chairman  
S. Benjamin  
G. van Kaick  
K. Wegener  
H. Wesch  
T.M. Koval, NCRP Staff

Scientific Committee 57-15\* on *Uranium Risks* is examining uranium in terms of its



chemical and radiotoxicity. A draft report is being revised based on NCRP critical review comments and is expected to go to the Council for review by mid-1999. A delay in getting the report to the Council review stage has resulted from the time required to modify the model used in the report. This has been completed and other sections of the draft have been updated. The draft will be sent to Council review as soon as final details are resolved.

The membership of Scientific Committee 57-15\* is as follows:

J.R. Johnson, Chairman  
B.B. Boecker  
J.S. Bogard  
L.W. Cole  
A.F. Eidson  
E.C. Foulkes  
S.A. Fry  
L.A. Fairbent, NCRP Staff

Scientific Committee 57-17 on *Radionuclide Dosimetry Models for Wounds* is focused on developing a model for determining doses from various types of radionuclide-contaminated wounds. The Committee had its initial meeting in November 1997 and a second meeting in February 1998. A third meeting was held on June 3, 1998 in Baltimore to allow Dr. McDiarmid to attend to present information regarding human wounds contaminated with depleted uranium. Fourth and fifth meetings were held on December 3-4, 1998 and March 17-18, 1999. The Committee continues to discuss critical issues and review and modify drafted material. The next meeting is planned for September 1999.

The membership of Scientific Committee 57-17 is as follows:

B.D. Breitenstein, Jr., Chairman  
E.G. Daxon  
P.W. Durbin  
R.E. Goans  
R. Guilmette  
J.J. Russell  
R.E. Toohey  
R. Clark, Advisor  
J. Piechowski, Adviser  
M. McDiarmid, Consultant  
T.M. Koval, NCRP Staff

### Environmental Issues

Scientific Committee 64\* is the NCRP scientific program area committee concerned with *Environmental Issues*. Functioning in the Scientific Committee 64\* area are Scientific Committee 64-18 on *Ecologic and Human Risks from Space Applications of Plutonium*, Scientific Committee 64-19\* on *Historical Dose*, Scientific Committee 64-20\* on

*Contaminated Soil*, Scientific Committee 64-22\* on *Design of Effective Effluent and Environmental Monitoring Programs*, and Scientific Committee 64-23\* on *Cesium in the Environment*. Scientific Committee 64\* had a meeting in December at which the members reviewed the program and made recommendations to the NCRP Board of Directors.

Currently authorized but unfunded activities within this program area are:

- *Radiation Protection Criteria for Plants and Animals*
- *Contaminated Ecosystems: Remediation or Management?*
- *Symposium on Comparison of Methods for Estimating Radiological and Chemical Risks*
- *Symposium on the Comparison of Regulatory Approaches to Management of Radiological and Chemical Risks*
- *Usage Factors for Environmental Dose Calculations*

The membership of Scientific Committee 64\* is as follows:

J.E. Till, Chairman  
L.R. Anspaugh, Vice Chairman  
M.W. Carter, Chairman Emeritus  
F.J. Congel  
T.V. Crawford  
E.G. de Planque  
K.F. Eckerman  
H. Grogan  
F.O. Hoffman  
R. Jaquish  
B. Kahn  
C. Whipple  
L.A. Fairbent, NCRP Staff

Scientific Committee 64-18 on *Ecologic and Human Risks from Space Applications of Plutonium* has completed a draft of their report and currently a printer's manuscript is being prepared. It is anticipated that the report will be published in 1999.

The membership of Scientific Committee 64-18 is as follows:

R.A. Guilmette, Chairman  
F. Gelbard  
W. Hansen  
W.C. Inkret  
B.A. Muggenburg  
J.W. Poston, Sr.  
W.L. Robison  
G.L. Voelz  
J.R. Trabalka, Advisor  
E.I. White, NCRP Staff

Scientific Committee 64-19\* on *Historical Dose* is working on a draft report. No meetings are currently scheduled due to lack of funding.

The membership of Scientific Committee 64-19\* is as follows:

J.E. Till, Chairman  
A. Bouville  
H.A. Grogan  
G.R. Howe  
T.B. Kirchner  
K.J. Kopecky  
K.R. Meyer  
P. Voillequé  
C. Miller, Consultant  
P. Garbe, Consultant  
M. Balonov, Advisor  
L.A. Fairbent, NCRP Staff

Scientific Committee 64-20\* on *Contaminated Soil* addresses scenarios leading to soil contamination, migration pathways, exposure pathways, and contamination limits. The report, *Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies*, was published as NCRP Report No. 129 in January 1999.

The membership of Scientific Committee 64-20\* is as follows:

H.L. Beck, Chairman  
D. Baker  
A. Bouville  
F.O. Hoffman  
W.L. Robison  
J.H. Shinn  
S.L. Simon  
E.I. White, NCRP Staff

Scientific Committee 64-22\* on *Design of Effective Effluent and Environmental Monitoring Programs* had its first meeting in May 1997 where an outline was developed and writing assignments were made. A second meeting was held in August 1997 where the outline was modified and drafting assignments were extended. A third meeting was held in November 1997. The fourth and fifth meetings were held in February and September 1998 to review drafted material. The funding for this Committee has been discontinued and no meetings are planned at this time.

The membership of Scientific Committee 64-22\* is as follows:

B. Kahn, Chairman  
J.D. Berger

J. Glissmeyer  
C.V. Gogolak  
N. Golchert  
R.E. Jaquish  
J.A. Johnson  
S.K. Nair  
B. Napier, Consultant  
L.A. Fairobent, NCRP Staff

Scientific Committee 64-23\* on *Cesium in the Environment* had its first meeting in June 1997 where an outline was developed and writing assignments were made. The second meeting was held in October 1997. A third meeting occurred in January 1998 where the draft was reviewed and assignments extended. The fourth and fifth meetings were held in May and November 1998. The funding for this Committee has been discontinued and no meetings are planned at this time.

The membership of Scientific Committee 64-23\* is as follows:

F.W. Whicker, Chairman  
C.T. Garten, Jr.  
D.M. Hamby  
K.A. Higley  
T.G. Hinton  
D.J. Rowan  
R.G. Schreckhise  
L.A. Fairobent, NCRP Staff

Scientific Committee 66 on *Biological Effects and Exposure Criteria for Ultrasound* is examining exposure criteria based on all known mechanisms of interaction of ultrasound with tissue. The Committee has assembled the final text of the report. The Secretariat is preparing the current draft for critical review.

The membership of Scientific Committee 66 is as follows:

W.L. Nyborg, Chairman  
P.L. Carson  
E.L. Carstensen  
F. Dunn  
D.L. Miller  
M.W. Miller  
H.E. Thompson  
M.C. Ziskin  
R.F. Apfel, Consultant  
L.A. Crum, Consultant  
C.C. Church, Consultant  
E.E. Kearsley, NCRP Staff

Scientific Committee 72 on *Radiation Protection in Mammography* has prepared a draft report which updates NCRP Report No. 85, *Mammography — A User's Guide*. The Committee is in the late stages of completing a report which will review and discuss the technical improvements in equipment and technique, the effect of MQSA on the quality of mammograms and their interpretation, and a complete review of the literature on the risks and benefits of mammography. It is expected that the report will be ready for review by the Council members in 1999.

The membership of Scientific Committee 72 is as follows:

L.N. Rothenberg, Chairman  
S.A. Feig  
A.G. Haus  
R.E. Hendrick  
G.R. Howe  
J.L. McCrohan  
E.A. Sickles  
M. Yaffe  
W.W. Young  
L.A. Fairbent, NCRP Staff

Scientific Committee 75\* on *Guidance on Radiation Received in Space Activities* is responsible for the preparation of a report to replace NCRP Report No. 98, *Guidance on Radiation Received in Space Activities*. This new draft report updates the material published in NCRP Report No. 98, *Guidance On Radiation Received In Space Activities*. The draft report submitted to critical and Council review concurrently is being revised in the light of comments received during the review process.

The membership of Scientific Committee 75\* is as follows:

R.J.M. Fry, Chairman  
E.J. Ainsworth  
E.A. Blakely  
J.D. Boice, Jr.  
S.B. Curtis  
C.E. Land  
D.E. Robbins  
W.K. Sinclair  
L.W. Townsend  
M.L. Meistrich, Advisor  
E.E. Kearsley, NCRP Staff

Scientific Committee 85\* on *Risk of Lung Cancer from Radon* is completely rewriting NCRP Report No. 78, *Evaluation of Occupational and Environmental Exposures to Radon and Radon Daughters in the United States*. Since Report No. 78 was published, significant new data and reviews have become available. These include the NAS/NRC BEIR IV report and the NAS/NRC BEIR VI report. The draft report of Scientific Committee 85\* is currently being prepared for review by the Council membership.

The membership of Scientific Committee 85\* is as follows:

N.H. Harley, Chairman  
D.B. Chambers  
F.T. Cross  
H. Evans  
A. Goodwin  
J.H. Lubin  
J. Neuberger  
J.B. Schoenberg  
E.S. Robbins, Consultant  
P. Groer, Advisor  
H.L. Kusnetz, Advisor  
L.A. Fairbent, NCRP Staff

Scientific Committee 86\* on "*Hot Particles*" in the *Eye, Ear or Lung* is responsible for the preparation of an NCRP Report on "hot particles." The Committee's draft report has been reviewed by the Council members. Council members' comments have been addressed. The printer's manuscript is currently being prepared. The report, NCRP Report No. 130, *Biological Effects and Exposure Limits For "Hot Particles,"* will replace NCRP Report No. 106, *Limit for Exposure to "Hot Particles" on the Skin.*

The membership of Scientific Committee 86\* is as follows:

T.F. Gesell, Chairman  
J.W. Baum  
J.W. Hopewell  
M.W. Lantz  
J.W. Osborne  
B. Scott  
S. Seltzer  
R.E. Shore  
B.V. Worgul  
W.D. Reece, Consultant  
M.J. Scannell, Consultant  
W.M. Beckner, NCRP Staff

### Radioactive and Mixed Waste

Scientific Committee 87\* is the NCRP scientific program area committee concerned with *Radioactive and Mixed Waste*. Functioning under this area are Scientific Committees 87-1\* on *Waste Avoidance and Volume Reduction*, Scientific Committee 87-2 on *Waste Classification Based on Risk*, Scientific Committee 87-3\* on *Performance Assessment*, and the newly formed Scientific Committee 87-4 on *Management of Waste Metals Containing Radioactivity*.

The membership of Scientific Committee 87\* is as follows:

M.T. Ryan, Chairman  
A.G. Croff  
W. Dornsife  
L.D. Eyman  
D.G. Jacobs  
M.W. Kozak  
D.W. Moeller  
S. Wiltshire  
E.I. White, NCRP Staff

Scientific Committee 87-1\* on *Waste Avoidance and Volume Reduction* is assessing methods for institutional users of radioactivity to minimize the amount of waste sent for disposal. The Committee is presently making final revisions to the report which will enter the Council review process in 1999.

The membership of Scientific Committee 87-1\* is as follows:

W.P. Dornsife, Chairman  
R. Garcia  
F.X. Masse  
J. Psaras  
E.H. Rau  
A. Wolbarst  
W. Hipsher, Consultant  
E.I. White, NCRP Staff

Scientific Committee 87-2 on *Waste Classification Based on Risk* is developing a scheme which classifies both radioactive and chemical wastes on a common scale. The Committee's draft report is currently being revised following critical review. A meeting will be scheduled when these revisions are completed.

The membership of Scientific Committee 87-2 is as follows:

A.G. Croff, Chairman  
M.J. Bell  
Y. Cohen  
L.C. Keifer  
D.C. Kocher  
D.J. Paustenbach  
V.C. Rogers  
A. Wallo  
E.I. White, NCRP Staff

Scientific Committee 87-3\* on *Performance Assessment* is examining the performance of low-level radioactive waste disposal systems. The Committee is in the late stage of preparing a draft for Council review.

The membership of Scientific Committee 87-3\* is as follows:

M.W. Kozak, Chairman  
W.E. Kennedy  
D.C. Kocher  
V.C. Rogers  
R.R. Seitz  
T. Sullivan  
E.I. White, NCRP Staff

Scientific Committee 87-4 on *Management of Waste Metals Containing Radioactivity* is in the early stages of its second activity, that of drafting an NCRP scientific report on management of waste metals containing radioactivity. The Committee finished their comments on the EPA technical support document on recycling of waste metals and the letter report from the NCRP President went to the EPA in June 1998. The first meeting to begin preparing an NCRP report occurred in October 1998. At the second meeting, held on March 15-16, 1999, the Committee reviewed written draft material, revised the draft outline, and planned the next meeting for September 1999.

The membership of Scientific Committee 87-4 is as follows:

S.Y. Chen, Chairman  
A. La Mastra  
C. Massey  
H.R. Meyer  
D.W. Moeller  
D.J. Strom  
J.G. Yusko  
J.O. Lubenau, Advisor  
M.T. Ryan, Advisor  
E.I. White, NCRP Staff

Scientific Committee 88\* on *Fluence as the Basis for a Radiation Protection System for Astronauts* is responsible for the preparation of an NCRP report on *Fluence as the Basis for a Radiation Protection System for Astronauts*. The Committee has concluded that there is not sufficient justification to recommend change from the current system to either a microdosimetry- or fluence-based system for managing or assessing space radiation hazards. The Committee's draft report is being prepared for concurrent critical and Council review.



The membership of Scientific Committee 88 is as follows:

S.B. Curtis, Chairman  
L.A. Braby  
J.F. Dicello  
M.N. Gould  
P. Groer  
W.K. Sinclair  
M.A. Zaider  
R.J.M. Fry, Advisor  
E.E. Kearsley, NCRP Staff

### Nonionizing Radiation

Scientific Committee 89\* is the NCRP program area committee on *Nonionizing Electromagnetic Fields*. The Committee is responsible for advising the NCRP Board of Directors on matters in this area. Functioning within the scope of this Committee are three report-writing committees: Scientific Committee 89-3 on Biological Effects of Extremely Low Frequency Electric and Magnetic Fields, Scientific Committee 89-4 on Biological Effects and Exposure Recommendations for Modulated Radiofrequency Fields, and Scientific Committee 89-5 on Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields.

A currently authorized but unfunded activity within this program area is:

- Effects of Exposure to Ultraviolet Radiation

The membership of Scientific Committee 89\* is as follows:

T.S. Tenforde, Chairman  
A.W. Guy  
J.E. Cleaver  
D. Hoel  
J.C. Lin  
D.H. Sliney  
J.A.J. Stolwijk  
R.A. Tell  
M.C. Ziskin  
T.M. Koval, NCRP Staff

Scientific Committee 89-3 on *Biological Effects of Extremely Low Frequency Electric and Magnetic Fields* is summarizing the biological effects of ELF fields and is currently revising a draft report in response to comments received from the NCRP critical review process. The Committee recently held a teleconference to discuss the draft's status and make plans for completing the revisions. When revisions are completed, the draft will be forwarded to the full Council for review.

The membership of Scientific Committee 89-3 is as follows:

W.R. Adey, Chairman  
L.A. Anderson  
C.F. Blackman  
D.O. Carpenter  
W.E. Feero  
M. Frazier  
R.H. Lovely  
R.A. Luben  
M. Misakian  
M.E. O'Connor  
R.G. Stevens  
C.F. Ehret, Advisor  
K.R. Groh, Advisor  
J.E. Morris, Consultant  
C.J. Maletskos, NCRP Staff

Scientific Committee 89-4 on *Biological Effects and Exposure Recommendations for Modulated Radiofrequency Fields* had four meetings through mid-1996. No meetings have occurred since and the Committee has communicated primarily by e-mail. A preliminary draft has been circulated to members for review and comment and is currently undergoing revision. It is expected that a completed draft can be obtained by mid-1999.

The membership of Scientific Committee 89-4 is as follows:

O. Gandhi, Chairman  
J. D'Andrea  
K.R. Foster  
A.W. Guy  
D.R. Justesen  
I. Nair  
A.R. Sheppard  
T.M. Koval, NCRP Staff

Scientific Committee 89-5 is working on an NCRP report on *Biological Effects and Exposure Criteria of Radiofrequency Electromagnetic Fields*. The Committee is currently in the midst of drafting initial versions of sections. When completed, this report will replace NCRP Report No. 86. Committee activities were slowed somewhat by the resignation of a Committee member earlier this year due to a job change. This necessitated the addition of a replacement to assume the corresponding drafting responsibilities. The new member has been added. The next meeting of the Committee will be scheduled when initial drafts of all sections are available for review. It is anticipated that a completed draft of the report will be ready for review by early in 2000.

R.J. Vetter  
C.G. Whipple  
E.E. Kearsley, NCRP Staff

A currently authorized but unfunded activity within this program area is:

- *Allocation of Resources to Obtain Optimal Dose Reduction*

### Radiation Measurement

Scientific Committee 93\* is the NCRP program area committee on *Radiation Measurement and Dosimetry*. The Committee is responsible for advising the NCRP Board of Directors on matters in this area. Although no report-writing committees are currently functioning within this area, potential topics have been discussed. The Committee is planning to meet on April 6, 1999.

Currently authorized but unfunded activities within this program area are:

- *Update of NCRP Report No. 58 Handbook of Radioactivity Measurements*
- *Biological Dosimetry*
- *Guidance on Measurements for Quality Assurance and Verification for Conformal Radiation Therapy*
- *Aerosol Measurements*
- *Radiation Measurement Accuracy*
- *Background Levels of Radionuclides in the Environment*

The membership of Scientific Committee 93\* is as follows:

H.L. Beck, Chairman  
L. Braby  
P. DeLuca  
J. Dicello  
F.M. Dietrich  
K. Eckerman  
N. Harley  
G. Knoll  
R. Leggett  
A. Lucas  
R. Nath  
C.J. Maletskos, NCRP Staff

**Note:** The National Council on Radiation Protection and Measurements (NCRP) has historically limited its Scientific Committee efforts to the publication of reports, commentaries and statements. The NCRP is now available to provide general scientific advice, such as conducting scientific symposia, reviewing background information to be used by an agency for rule making, and other activities where a scientific consensus dealing with radiation issues is needed. It is expected, in most cases, that the scientific committee performing such a review would later be funded to draft an NCRP document which would provide general guidance on the given subject to the radiation protection community at large.

**Progress Report**  
**NRC Grant 04 98 052**

Period covered by this report: January 1, 1999 through March 31, 1999

Activities reported on:

- Scientific Committee 1 - Basic Criteria, Epidemiology, Radiobiology and Risk
- Scientific Committee 1-4 - Extrapolation of Risks from Non-Human Experimental Systems to Man
- Scientific Committee 1-6 - Linearity of Dose Response
- Scientific Committee 1-7 - Information Needed to Make Radiation Protection Recommendations for Travel Beyond Low-Earth Orbit
- Scientific Committee 1-8 - Risk to Thyroid from Ionizing Radiation
- Scientific Committee 9 - Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies up to 10 MeV
- Scientific Committee 46 - Operational Radiation Safety
- Scientific Committee 46-8 - Radiation Protection Design Guidelines for Particle Accelerator Facilities
- Scientific Committee 46-10 - Assessment of Occupational Doses from Internal Emitters
- Scientific Committee 46-11 - Radiation Protection During Special Medical Procedures
- Scientific Committee 46-13 - Design of Facilities for Medical Radiation Therapy
- Scientific Committee 46-14 - Radiation Protection Issues Related to Terrorist Activities That Result in the Dispersal of Radioactive Material
- Scientific Committee 57-10 - Liver Cancer Risk
- Scientific Committee 57-15 - Uranium Risks
- Scientific Committee 57-17 - Radionuclide Dosimetry Models for Wounds
- Scientific Committee 64 - Environmental Issues
- Scientific Committee 64-18 - Ecologic and Human Risks from Space Applications of Plutonium
- Scientific Committee 64-19 - Historical Dose
- Scientific Committee 64-22 - Design of Effective Effluent and Environmental Monitoring Programs
- Scientific Committee 64-23 - Cesium in the Environment
- Scientific Committee 66 - Biological Effects and Exposure Criteria for Ultrasound
- Scientific Committee 72 - Radiation Protection in Mammography
- Scientific Committee 75 - Guidance on Radiation Received in Low Earth Orbit
- Scientific Committee 85 - Risk of Lung Cancer from Radon
- Scientific Committee 86 - "Hot Particles" in Eye, Ear or Lung
- Scientific Committee 87 - Radioactive and Mixed Waste
- Scientific Committee 87-1 - Waste Avoidance and Volume Reduction
- Scientific Committee 87-2 - Waste Classification Based on Risk
- Scientific Committee 87-3 - Performance Assessment
- Scientific Committee 87-4 - Management of Waste Metals Containing Radioactivity

- Scientific Committee 88 - Fluence as the Basis for a Radiation Protection System for Astronauts
- Scientific Committee 89 - Nonionizing Electromagnetic Fields
- Scientific Committee 89-3 - Biological Effects of Extremely Low Frequency Electric and Magnetic Fields
- Scientific Committee 89-4 - Biological Effects and Exposure Recommendations for Modulated Radiofrequency Fields
- Scientific Committee 89-5 - Biological Effects and Exposure Criteria for Radiofrequency Fields
- Scientific Committee 91 - Radiation Protection in Medicine
- Scientific Committee 91-1 - Precautions in the Management of Patients Who Have Received Therapeutic Amounts of Radionuclides
- Scientific Committee 91-2 - Radiation Protection in Dentistry
- Scientific Committee 91-3 - Exposure of the U.S. Population from Diagnostic Medical Radiation with Emphasis on Radiation Exposure of the Female Breast
- Scientific Committee 92 - Public Policy and Risk Communication
- Scientific Committee 93 - Radiation Measurement and Dosimetry

**Status of funding for NRC Grant No. NRC 04 98 052:**

Total funding obligated: March 2, 1998 to February 28, 2001:	\$200,378.00
Billings through March 31, 1999:	\$104,043.23
Funds remaining as of March 31, 1999:	\$ 96,334.77