

CIRRPC

**REPORT ON IDENTIFICATION
OF
FEDERAL RADIATION ISSUES**

*TO THE FEDERAL COORDINATING
COUNCIL FOR SCIENCE, ENGINEERING
AND TECHNOLOGY*

March 1986

**Committee on Interagency Radiation
Research and Policy Coordination**

Office of Science and Technology Policy
Executive Office of the President
Washington, D.C. 20506

The Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) is chartered through the Federal Coordinating Council for Science, Engineering and Technology (FCCSET), Office of Science and Technology Policy, Executive Office of the President, Washington, D.C. 20506.

NOTICES

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*Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Housing and Urban Development, Interior, Justice, Labor, State and Transportation; Environmental Protection Agency, Federal Emergency Management Agency, National Aeronautics and Space Administration, Nuclear Regulatory Commission, Office of Management and Budget, Veterans Administration and the National Security Council.

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I. Introduction

The Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) was established on April 9, 1984 by the Office of Science and Technology Policy (OSTP) under the authority of the Federal Coordinating Council for Science, Engineering and Technology (FCCSET), as shown in Figure 1. It is chaired by OSTP. CIRRPC membership consists of those agencies having specific responsibilities or interest in radiation research and/or policy.

CIRRPC has two elements: the Committee itself, consisting of subcabinet and senior policy level representatives, and a Science Panel, consisting of senior radiation scientists from the respective member agencies. The structure and membership of CIRRPC is shown in Figure 2. It was decided at the inception of CIRRPC to identify the radiation issues of concern to the Federal agencies, Congress, and professional societies faced with radiation policy or scientific issues. It was felt that a current list of national radiation issues should be assembled so that CIRRPC could concentrate on these issues and the dividends from CIRRPC's resources could be maximized at the earliest possible time.

II. Issues Development

At the first meeting of CIRRPC on May 25, 1984, each of the member agencies was requested to identify current radiation issues of concern to them. A similar request was also sent to appropriate congressional committee chairmen and members. National professional organizations concerned with radiation matters also responded.

In December 1984, the CIRRPC Executive Committee began a series of meetings with senior staff of each member agency. Specific matters affecting agencies' programs were brought to light, problem areas identified and invaluable perspectives gained into the major issues affecting Federal government operations, upon which CIRRPC must focus its attention.

Since the Congress and national professional societies provided their input quite independently from those of the Federal agencies, a further cross-section of opinion was achieved.

A number of Federal agencies, congressional respondents and professional societies have emphasized that the broad U.S. policies, regulations and standards that provide the overall umbrella for national radiation protection have not been systematically reviewed and updated since 1960, and that this is urgently needed. The Federal Radiation Council was disestablished in 1970, and this resulted in a loss of effectiveness in coordinating Federal policy on radiation issues. The Congress noted this lack of coordination and cohesiveness among the Federal agencies in policy-making and standards-setting and supported CIRRPC's efforts in this regard.

III. Listing of Issues

Ten national radiation issues were identified as follows:

- Federal Radiation Policy, Regulations and Standards
- Radiation Compensation
- Radon
- Non-Ionizing Radiation
- High-LET Radiation
- Food Irradiation
- Radioactive Wastes
- Radiation Measurements, Records and Control
- Public Information and Education
- Emergency Preparedness and Clean-Up Standards

IV. Definition and Aggregation of Radiation Issues

The preceding list of issues results from the aggregation of 34 specific issues into 10 major topics. Diverse policy, research, management and science issues were cited by the respondents and these are integrated into the 10 topics.

The purpose of this section is to list the composition of the 10 issues.

Federal Radiation Policy, Regulations and Standards

This issue includes the following elements or was expressed in the following ways:

- Need for consistent Federal radiation policies;
- Need for mutually consistent and coordinated radiation regulations and standards, particularly those involving multiple Federal agencies and jurisdictions;
- Establishment of radiation levels below regulatory concern (*de minimis*);
- Coordination of U.S. policies and positions on radiation issues at international policy meetings;
- Updating of U.S. radiation policy, regulations and review of existing standards (particularly revisions of 10 CFR Part 20 and FRC Report No. 1);
- Clarification of As Low As Reasonably Achievable (ALARA) policy;
- Need for scientifically-based standards;
- "Umbrella" dose limits, age-averaging, dose commitments, *in utero* standards and collective doses; and
- Introduction of a risk-based standards system, standardized radiation risk estimation and comparability with other risks.

Radiation Compensation

Compensation procedures for radiation injury have profound policy, legal and scientific implications. It is of primary interest to the Justice Department in adjudicating radiation injury claims of all types. The Veterans Administration is interested in the applicability of the Radioepidemiological Tables (for estimating the probability of causation of radiogenic cancers) to the many veterans' radiation injury claims related to low level radiation exposure. The Defense Department is concerned over the possible operational impact of occupational exposure of military personnel. The Interior Department is interested because of claims arising from exposure of native Americans and residents of the Pacific Trust Territories. The Department of Health and Human Services, which was assigned the task of preparing Radioepidemiological Tables by the Congress, is concerned over the appropriate use of the tables. The Labor Department and Nuclear Regulatory Commission also have an interest in this issue from the standpoint of worker exposures.

The Senate Subcommittee on Nuclear Regulation of the Committee on Environment and Public Works and the Senate Labor and Human Resources Committee held joint hearings on this subject in 1985. Those individuals alleging injury from radiation exposure and others such as professional societies, insurance groups, environmental groups, the medical community and the nuclear industry are also vitally interested in this issue.

This issue includes the following elements or was expressed in the following ways:

- Development of Radioepidemiological Tables, estimating the probability of causation of radiogenic cancers and their application,
- Applicability of input derived from Japanese nuclear bomb survivors, medically exposed populations, animal studies and cell/tissue research;
- Low-level radiation effects;
- Risk assessment models, methodologies and risk coefficients for various types of radiation at various human sites;
- Cancer inductions from external exposure and internally deposited radionuclides;
- Relating the biological effects of different types of radiation to one another;
- Genetic and hereditary effects; and
- Life shortening considerations.

Radon

The primary national interest in radon is currently focused on indoor radon, although outdoor radon has received Federal and state attention for more than a decade as it relates to uranium mill tailings and residues from mining, milling and processing of phosphate and other natural ores in the United States. There are specific populations which Federal agencies and Congress are concerned about, including: native Americans, uranium and other underground miners and residents near active and inactive uranium and phosphate mills. Recently, national attention has focused on indoor radon exposures in certain eastern U.S. states, such as Pennsylvania and New Jersey, where levels in houses are found to exceed levels used by the Federal government to clean up misused uranium mill tailings

Inhalation of naturally occurring radon progeny results in a significant contribution to the average radiation dose to the overall U.S. population.

Radon exposure has been suggested as a significant contributor to the rate of lung cancer in the U.S., 83% of which is attributed to smoking.

This issue includes the following elements or was expressed in the following ways

- Improved measurement techniques for absorbed doses from radon progeny, lung models and standard instruments;
- Determination of the magnitude of health risks from the inhalation of radon progeny through epidemiological studies,
- Improved state of knowledge of radon abatement measures;
- Need to inform the public in an authoritative and accurate way on the hazards from radon progeny and appropriate mitigating methods; and
- Need for a national radon agreement to determine average exposures and high dose areas in the U.S.

Non-Ionizing Radiation

The issue of non-ionizing radiation exposure as a potential public health hazard was raised by a number of Federal agencies and national organizations. The extensive and increasing use of equipment that generate various frequencies of non-ionizing radiation in telecommunications, electrical power generation, defense, consumer products and medical practice may be increasing exposure levels to non-ionizing radiation. The magnitude of this increased exposure of the U.S. population and any health consequences are not well known. This issue includes the nature and degree of exposure in the workplace, the home and in the environment

This issue includes the following elements or was expressed in the following ways:

- Radiofrequency radiation effects, including those from radiowaves, radar and ultra-high frequency radiation;
- Laser radiation effects;
- Ultrasound effects; and
- Effects from high electrical and magnetic fields.

High-LET Radiation

The biological effects of high linear energy transfer (LET) radiation, such as neutrons, alpha particles, protons and heavy nuclei, are not as well known as those of low linear energy transfer radiation such as x-rays, gamma rays and beta radiation.

This issue includes the following elements or was expressed in the following ways:

- Neutron quality factors and relative biological effectiveness;
- Absorbed doses;
- Dosimetry;
- Dose response relationships at low doses and at the molecular, cell, tissue, organ and organism level; and
- The effects of internally deposited radionuclides.

Food Irradiation

The need for alternative treatment methods for disinfestation of food commodities arises primarily from the banning of carcinogenic or mutagenic chemical fumigants and other chemicals used for pathogen and pest control. Pressures on U.S. food processors, exporters and importers to evolve an alternative solution to chemical treatment have increased. There is a Federal rulemaking pending on using food irradiation in the United States and several petitions have been granted by the Food and Drug Administration for food irradiation. Several bills advocating food irradiation have been introduced in Congress and congressional interest and funding for food irradiation has undergone a marked increase in Fiscal Year '86.

This issue includes the following elements:

- The efficacy and safety of irradiated foods regarding nutrition, pest control, pathogen reduction, shelf life extension and unique radiolytic products;
- Labelling of irradiated foods;
- Employee training and public education;
- Dosimetry
- Food inspection;
- Plant design and radiation source supply;
- Regulatory issues — state, national and international;
- Interagency coordination; and
- Petitioning, rulemaking and clearance of irradiated foods.

Radioactive Wastes

The radioactive waste issue transcends the nuclear energy, national security and nuclear medicine sectors of our society. The issue has two components: control of large quantities of low level waste in which the concentration of radionuclides is relatively low (such as power reactor "trash," mill tailings and nuclear medicine "effluent") and control and disposal of relatively small quantities of high level waste that have significantly higher concentrations (such as defense waste from reprocessing and spent fuel elements from nuclear power reactors). The two components require significantly different considerations in treatment, form, disposal sites, packaging and transportation and state and Federal jurisdictions and responsibilities.

This issue includes the following elements or was expressed in the following ways:

- Storage and processing;
- Packaging of radioactive wastes;
- Transportation of radioactive wastes;
- Disposal of radioactive wastes — regional low-level waste disposal sites and high-level national waste repositories;
- Regional low-level waste compacts among states;
- Accelerator induced low-level wastes;
- Disposition of mixed chemical and low-level radioactive wastes, and
- Waste at levels below regulatory concern

Radiation Measurements, Records and Control

The Federal agencies and professional societies have cited the need for accurate radiation measurements in the workplace, hospital and environment; quality control and calibration of dosimetric instruments; more comprehensive recording of individual radiation exposures and a better means to control occupational radiation exposure

This issue includes the following elements or was expressed in the following ways:

- Need for better dosimetry and more sensitive instruments to measure high-LET radiation (neutron and alpha particles), particularly as such measurements are used to determine absorbed doses;
- Transportation accidents involving radioactive material;
- Need for a national occupational exposure registry;
- Need to improve record-keeping of collective and individual doses, especially dose histories for

- individuals exposed in the workplace, home and hospital;
- The measurement and recording of mixed radiation (high and low-LET, external and internal) to organs, the whole body and extremities;
 - Internal dose assessment models and model validation;
 - Need for consistent and accurate radiation measurements, quality assurance system for dosimetric instruments and a standard means of instrument calibration; and
 - Review of the Federal philosophy of radiation control, with regard to implementing a risk-based system.

Public Information and Education

This issue has two distinct components. The first is the inadequacy of communications and interactions between the Federal agencies, the scientific community, the public and the various segments of the media on ionizing and non-ionizing radiation. The second component concerns the reduced flow of scientists trained in radiation from academe to the Federal and industrial sectors.

This issue includes the following elements or was expressed in the following ways:

- Need for a coherent and coordinated Federal public information policy on radiation;
- Need for consensus by radiation scientists and their peers;
- Need to enhance public confidence in Federal and state authorities in radiation matters;
- Support of academe in the education and training of radiation scientists; and
- Need to reverse the loss of radiation scientists to government and industry.

Emergency Preparedness and Clean-Up Standards

The degree of preparedness of the Federal and state sectors to deal with radiation emergency situations is of interest to a number of Federal agencies. Among other topics, it includes the need for more detailed emergency guidelines and standards.

This issue includes the following elements or was expressed in the following ways:

- Emergency situations involving nuclear power plants, nuclear weapons and accidents involving various other types of nuclear facilities and materials;
- Responses to transportation accidents involving radioactive materials;
- Clean-up and evacuation criteria;
- Overall emergency personnel training and readiness of manpower and equipment;
- Terrorist activities involving radioactive material;
- Coordination of international, Federal, state and local jurisdictions on emergency actions; and
- Public interactions and media interfaces.

V. Disposition of Issues by CIRRPC

Federal Radiation Policy, Regulations and Standards

In February, 1985, CIRRPC formed a Science Subpanel on the subject chaired by the Environmental Protection Agency. The Subpanel focused its attention primarily on the issue of whether or not the recommendation of the International Commission on Radiological Protection, for a two-fold increase in the neutron quality factor, has a compelling scientific basis for its adoption. It is expected that the Subpanel will focus next on the scientific merit of using the concept of collective dose in radiation protection.

Radiation Compensation

On November 8, 1984, the President's Science Advisor transmitted the CIRRPC Science Panel Report No. 1 on the "VA Health Assessment of Veterans with Military Service at Sites of Temporarily Augmented Ionizing Radiation"¹ to the Administrator of Veterans Affairs. The report concluded, "that it is highly unlikely that new

or useful information regarding the health effects of radiation would result from the proposed epidemiological study of veterans exposed to radiation during military operations in Japan or at nuclear weapons tests."

On January 25, 1985, the Science Advisor forwarded to the Secretary of the Department of Health and Human Services (HHS), the Science Panel Report on the draft Report of the National Institutes of Health (NIH) Ad Hoc Working Group to Develop Radioepidemiological Tables. CIRRPC Science Panel Report No. 2² concluded that the "report of the Ad Hoc Working Group is an excellent and scientifically responsible document which provides probabilities of causation on the basis of the current knowledge on radiation carcinogenesis in man." However, the CIRRPC Science Panel went on to observe "that there are several aspects of the report that require attention to define more clearly the limitations of the tables. An improved discussion of the uncertainties inherent to the PC (probability of causation of radiogenic cancer) calculation and guidance concerning application of the radioepidemiological tables to high-LET radiations and internally deposited radionuclides are particularly important." In closing, the Panel advised that "To the extent that the Panel's concerns cannot be adequately addressed by the present Ad Hoc Working Group, it is suggested that they be considered by any future working group established to update the tables"

In its final report of January 4, 1985, HHS took into consideration many of the comments of the CIRRPC Science Panel. CIRRPC Science Panel Report No. 3³ reviewed the final HHS report. On June 11, 1985, CIRRPC presented testimony before the Joint Hearing of the Senate Labor and Human Resources Committee and the Subcommittee on Nuclear Regulation of the Committee on Environment and Public Works.⁴ The testimony, which was coordinated with CIRRPC's member agencies, represented the official position of the Executive Branch on the HHS report. The far-reaching consequences of the application of the HHS report touches virtually all of the CIRRPC member agencies. The testimony expressed caution on the application of the tables and recommended further refinement, research and reduction of the uncertainties in the calculations.

The Administrator of Veterans Affairs has asked CIRRPC's guidance on the applicability of the Radioepidemiological Tables to rulemaking pursuant to Public Law 98-542 concerning radiation exposure compensation of veterans.

Radon

The CIRRPC Executive Committee established a Science Subpanel on radon protection problems and health effects. The Subpanel charter was presented to CIRRPC in June, 1985, with the Department of Labor chairing the Subpanel. The Subpanel will develop a Federal consensus on scientific issues regarding environmental radon exposure, with particular emphasis on the magnitude of health risks, the assessment of national exposures, and the state of knowledge regarding radon abatement measures. A report is being prepared for release in the spring of 1986 and will concentrate on the indoor radon problem.

The Chairman of CIRRPC met with the Conference on Radiation Control Program Managers on May 20, 1985 to discuss the radon problem. The Conference is composed of radiation control officials of the state agencies dealing with radiation matters.

Non-Ionizing Radiation

In response to a request from EPA, a Science Subpanel was formed on April 25, 1985, under the chairmanship of the Veterans Administration to review existing research programs on radiofrequency health effects and to define appropriate research. A draft report on the health effects of radiofrequency radiation was submitted to CIRRPC's Science Panel in February, 1986 and the final report is scheduled to be issued in the spring of 1986.

High-LET Radiation

In February, 1985, CIRRPC took up the issue of high linear energy transfer radiation, under the Chairmanship of the Department of Health and Human Services. This Subpanel's task includes: monitoring of ongoing scientific assessments of such groups as National Council on Radiation Protection and Measurement (NCRP), National Academy of Sciences (NAS), National Research Council's Committee on the Biological Effects of Ionizing Radiation (BEIR), and International Commission on Radiation Protection (ICRP). The Department of Energy submitted a "Multiagency Research Plan for Resolving Problems Associated with Low Level Exposure to Neutrons" to CIRRPC for review.

Food Irradiation, Radioactive Wastes, Radiation Measurements, Records and Control, Public Information and Education and Emergency Preparedness and Clean-up Standards

CIRRPC has not taken up these five issues since no requests to explore these issues have been received from Federal agencies. However, a proposed Congressional bill has a provision that CIRRPC coordinate Federal food irradiation activities

In addition to the above activities, CIRRPC formed policy subpanels on SI Metric Units and Radio-epidemiological Tables.

VI. Summary

CIRRPC has identified the major radiation issues of concern in the United States. It has taken action on five of the 10 issues as requested by Federal agencies.⁵

VII. References

1. CIRRPC Science Panel Report No. 1 — "VA Health Assessment of Veterans With Military Service at Sites of Temporarily Augmented Ionizing Radiation," September 7, 1984.
2. CIRRPC Science Panel Report No. 2 — "CIRRPC Scientific Report on the Draft Report of the Ad Hoc Working Group to Develop Radioepidemiological Tables," November 6, 1984.
3. CIRRPC Science Panel Report No. 3 — "CIRRPC Scientific Report on the Report of the Ad Hoc Working Group to Develop Radioepidemiological Tables," June 1, 1985.
4. CIRRPC Testimony before the Committee on Labor and Human Resources and Subcommittee on Nuclear Regulation of the Committee on Environment and Public Works, "Hearings on Report of the National Institutes of Health Ad Hoc Working Group to Develop Radioepidemiological Tables," June 11, 1985.
5. "First Annual Report — Committee on Interagency Radiation Research and Policy Coordination," June 30, 1985.

Figure 1 — CIRRPC's Location in Executive Branch

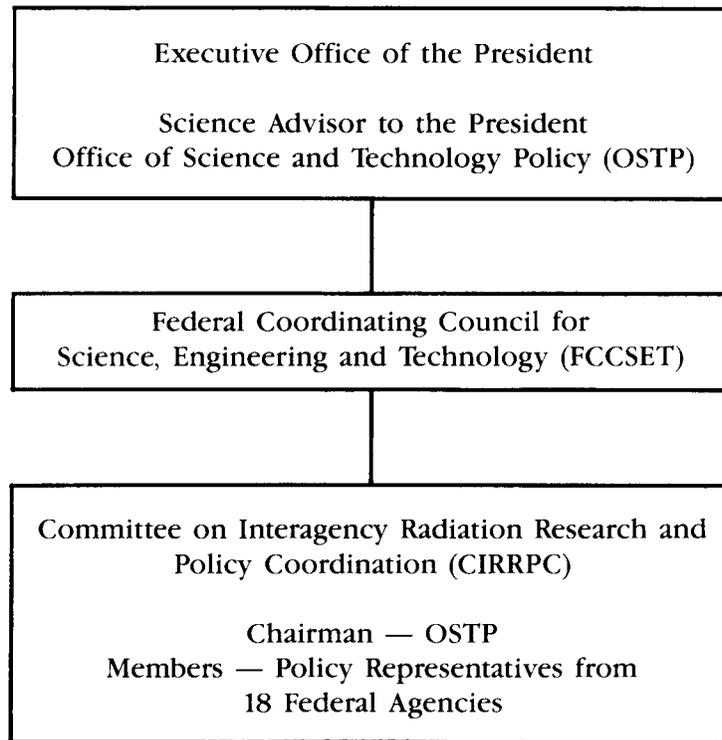


Figure 2 — CIRRPC's Organizational Structure

