Urban Studies and Public Administration
Vol. 3, No. 3, 2020
www.scholink.org/ojs/index.php/uspa
ISSN 2576-1986 (Print) ISSN 2576-1994 (Online)

Original Paper

Radiation Research and Policy Coordination: A Successful Model

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Received: July 19, 2020 Accepted: July 31, 2020 Online Published: August 8, 2020

doi:10.22158/uspa.v3n3p183 URL: http://dx.doi.org/10.22158/uspa.v3n3p183

Abstract

The Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) was charted in April 1984 by the Office of Science and Technology Policy, Executive Office of the President, Washington, DC because there was a need to ensure that Federal policies and research applicable to the use and control of radiation sources were well coordinated and integrated. The creation and maintenance of a convenient neutral forum provided opportunities for examining various agency and public interests in radiation research and policy formulation. During its 11 years of existence, the success of CIRRPC's policy and research initiatives were supported by a professional and administrative staff whose operations were housed in a central and neutral facility that served as a focal point for the radiation coordination activities of the 18 member agencies and departments that were brought together to discuss radiation and scientific issues of mutual interest. For over a decade CIRRPC was recognized nationally and internationally for its activities, and its preparation and publication of more than 20 major reports. CIRRPC was a model of how the Federal government should coordinate radiation issues for the United States.

Keywords

radiation research, radiation policy, coordination of federal agencies, committee on radiation research and policy coordination, CIRRPC

1. Introduction

Almost 70 years ago, US President Dwight Eisenhower announced the "Atoms for Peace" initiative with the hope that a vast array of new and emerging nuclear and radiation technologies would benefit mankind. Today we know that radiation plays a role in all segments of American Society—in health, energy, defense, communications, transportation, space exploration, foreign affairs, etc.—either in the form of technology or research. Total avoidance of exposure is not possible because radiation and radioactive materials are ubiquitous in our everyday environment. Despite the role of radiation technologies in everyday life, public reaction to radiation risks are generally not in agreement with the scientific understanding of these risks. Indeed, public awareness and perception have tended to focus on the existence of scientific uncertainty and not on the overall benefit and risk (Young, 1999). The challenge has always been the lack of consistency of how the Federal government provides oversight and support to radiation policy and research. Too often each new administration has viewed radiation research and policy as a responsibility of individual agencies depending on how that agency uses radiation. Therefore, there was a need to ensure that Federal policies and research applicable to the use and control of radiation sources were well coordinated and integrated. The creation and maintenance of a convenient neutral forum that provided opportunities for examining various agency and public interests in radiation issues was needed because such policies and research often involve many Federal agencies. This need was met with the establishment of The Committee on Interagency Radiation Research and Policy Coordination (CIRRPC), 1984-1995.

2. Brief History of Radiation Oversight

The need to achieve public expectations was mandatory for Federal policies that involved the assurance of protecting public health and safety. The evolution of radiation protection from the beginning of the atomic age involved the recognition of the need for interagency and international coordination. The Atomic Energy Act of 1946 established the Atomic Energy Commission (AEC) to promote the "utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public." However, prior to 1959 there was no official agency within the Executive Branch of the United States Government assigned the development of radiation protection standards or guidance for all Federal agencies. As noted, each agency was free to formulate whatever standards it deemed appropriate to its radiation protection responsibilities (Palmiter, 1968). The programs and responsibilities of many agencies and departments tended to impinge and overlap, and radiation protection and practices were essentially based on those recommended by the National Committee (now Council) on Radiation Protection and Measurement (NCRP), sponsored by the US National Bureau of Standards (Palmiter, 1968).

At the Federal level, the Federal Radiation Council was established by President Eisenhower through an Executive Order in August 1959. The President directed the Department of Health, Education and Welfare with the responsibility within the Executive Branch for the collection, analyses, and

interpretation of data on environmental radiation levels. The Council was to advise the President with respect to radiation matters directly or indirectly affecting health (Flemming, 1959). President Jimmy Carter established its successor organization, the Federal Radiation Policy Council, and the Interagency Radiation Research Committee, and these two organizations performed important coordinating activities. These Councils were abolished by the Reorganization Plan of 1970, and all functions were transferred to the Environmental Protection Agency (EPA). Prior to that action, Congress enacted the "Radiation Control for Health and Safety" Act that authorized the Food and Drug Administration (FDA) to set federal radiation standards, to monitor compliance, and to conduct research. However, with the Federal Guidance Authority transferred to EPA, that agency assumed the responsibility to provide advice to all Federal agencies about radiation matters directly or indirectly affecting public health through published technical reports and policy recommendations (EPA, 2019).

3. The Establishment of CIRRPC

The Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) was chartered on April 9, 1984, by Dr. George A. Keyworth II, than Science Advisor to President Ronald Reagan, and Director of the Office of Science and Technology Policy (OSTP), Executive Office of the President. Dr. Keyworth saw a continuing need to address Congressionally mandated and agency-instigated issues related to radiation research and policy. This need was highlighted in a letter sent to Dr. Keyworth by Senator John Glenn (D-Ohio) in which Glenn cited "the anarchy that existed with respect to the setting of radiation standards" (Young, Dix, 1988). Dr. Keyworth was also concerned with ensuring that regulations to control radiation exposures in the workplace and, especially, levels of radioactive materials in the environment, were based on the best available and credible evidence regarding human health. He therefore established CIRRPC as a committee of the Federal Coordinating Council for Science, Engineering and Technology (FCCSET) to address this need and to serve as a forum where its 18 member agencies could exchange information and discuss and resolve issues of national significance (Young, 1995). In 1994, CIRRPC became a subcommittee of the Committee on Health, Safety and Food, under the National Science and Technology Council (NSTC) (Young, 1995).

As noted, CIRRPC was made up of 18 member agencies that were each represented by subcabinet or senior policy officers. The officials represented their agencies on CIRRPC and its subpanels and reviewed and approved reports developed by CIRRPC. A Chair, Vice Chair, and an Executive Secretary served as CIRRPC officers. The Chair was appointed by OSTP and the same individual served for the entire 11 years of the Committee's existence (OSTP, 1995). CIRRPC held general Policy Meetings two or three times a year to review the program and to address radiation policy issues that cut across multiple Federal agencies. Topics covered in Policy Meetings included risk assessment and risk management, cooperative radiation research activities between the United States and the former Soviet Union, decommissioning and cleanup criteria related to waste management, health concerns over exposure to depleted uranium during the Persian Gulf War, and status of scientific significance on the

Radiation Effects Research Foundation (RERF), a program jointly managed by the United States and Japan. These briefings served as an effective means for sharing information and enhancing cooperation on the topics discussed (OSTP, 1995).

The CIRRC Science Panel was composed of senior science representatives from 15 member agencies with interest in technical and scientific issues. The Science Panel also had a Chair, Vice Chair, and an Executive Secretary. The principal responsibilities of these individuals were to develop agendas for the Science Panel meetings and to oversee progress of the numerous Science Panel activities. The Science Panel meet monthly not only to discuss radiation and scientific issues of mutual interest, but also to conduct briefings on activities, including research programs, and to review reports developed by science subpanels (OSTP, 1995).

A key component critical to the success of the CIRRPC program was the technical and administrative support required to facilitate CIRRPC's operation. This was provided through a Department of Energy (DOE) contract with Oak Ridge Associated Universities (ORAU), a not-for-profit research and development consortium of universities and colleges. Throughout the Committee's 11-year existence, highly professional and competent individuals from ORAU were affiliated with CIRRPC programs. Federal agencies were authorized by statute and Presidential Executive Order to make resources available for interagency committee activities, such as CIRRPC. Member agencies annually provided funds for CIRRPC operating costs to cover the technical and administrative support and other expenditures, such as contracts with the National Academy of Sciences (NAS), and the Council on Radiation Protection and Measurement (NCRP). Specific examples of CIRRPC projects funded by multiagency contributions through the DOE/ORAU arrangement included:

- NAS/NRC Report: *Health Effects of Low Levels of Ionizing Radiation: BIER V*, ($900,000),
- NCRP Reports: *Collective Dose and Radon* ($250,000), and,
- ORAU Report: *Health Effects of Low-Frequency Electric and Magnetic Fields* ($550,000) (ORAU, 1992; Special Report, 1993).

The total overall CIRRPC budget was approximately $1.2 million per year. The benefits of this arrangement were many, including the ability to provide rapid and expert technical, contractual, and consultant support. But perhaps the most important benefit was having CIRRPC's operations housed in a central and neutral facility that served as a focal point for radiation coordination activities of the member Federal agencies and Departments. Thus, this contractual arrangement provided a stable long-term method that enabled the Committee to operate continuously for over 11 years. No other arrangement would have been able to support the hundreds of subpanel, Executive Committee, Science Panel and Policy meetings and other CIRRPC activities, including the publication of reports (OSTP, 1995).

4. CIRRPC Findings and Recommendation on Specific National Radiation Issues

At the first CIRRPC meeting on May 25, 1984 the member agencies were requested to identify radiation issue of current concern to them. The following national radiation issues were identified and an example of CIRRPC's response to these concerns (OSTP, 1995).

4.1 Federal Radiation Policy, Regulations and Standards

A major *raison d'etre* for establishing CIRRPC was to enhance cooperation and organization among Federal agencies to achieve coordination on regulations—based on the best available science—to protect members of the public and workers (OSTP, 1995). A major effort was the ORAU preparation of "*A Compendium of Major U.S. Radiation Protection Standards and Guides: Legal and Technical Facts*" (Mills et al., 1988).

4.2 Radiation Measurements, Records, and Controls

Federal agencies and professional societies cited the need for accurate radiation measurements in the workplace, hospitals, and environment (OSTP, 1995). In 1985, CIRRPC addressed the US policy on the national use of the International System of Units in the field of radiation. Policy Report "*SI Metric Radiation Units*" was published in 1986 (CIRRPC, 1986c).

4.3 Exposure, Dose, and Risk Assessment

Risk assessment and risk management were fundamental issues that concerned many government agencies responsible for protecting members of the public, as well as workers exposed to ionizing radiation (OSTP, 1995). CIRRPC addressed several issues relevant to improved radiation risk assessment. One example was a CIRRPC sponsored "*NCRP Report on the Assessment of Radiation Exposure to the U.S. Population*" (NCRP, 1987).

4.4 Health Effects of Low Levels of Radiation

One of the major challenges encountered by Federal agencies is determining the health effects of low levels of ionizing radiation; information that is obviously necessary in ensuring that US standards adequately protect both workers and the public (OSTP, 1995). Following the reassessment of the A-bomb dosimetry, CIRRPC sponsored an update of the 1980 NAS/NRC report on the biological effects of ionizing radiation. This report "*Health Effects of Exposure to Low Levels of Ionizing Radiation: BEIR V*", not only evaluated 11 more years of A-bomb cancer mortality data, but also reviewed new data on persons irradiated for medical purposes (NAS/NRC, 1990).

4.5 High Linear Energy Transfer Radiation

The initial survey of issues of concern to the Federal agencies noted that the biological effects of high linear energy transfer (high-LET) radiation, such as neutrons, alpha particles, protons, and heavy nuclei, while low-LET, such as x rays, gamma rays and beta radiation are not as well-known to the public (OSTP, 1995). Science Panel Report No. 10, "*Neutron Quality Factor*" was completed in 1995 (CIRRPC, 1995). The Science Panel examined the general concept of "quality factor" (Q) in radiation protection and the rationale for the selection of specific values of Q_n and made such recommendations to the Federal agencies, as appropriate.

4.6 Radon

Radon is a ubiquitous, naturally-occurring, gaseous radioactive element that has received national attention in the last decades of the 20th Century due to findings of higher-than-expected levels in some homes, caused by seepage of radon from soil in the surrounding ground and from soil below the ground. CIRRPC addressed the radon issue for both policy and coordination of scientific research (OSTP, 1995). Science Panel Report No. 4, "*Radon Protection and Health Effects*" provided several recommendations pertaining to research, the coordination of, and the approaches to radon issues by Federal agencies (CIRRPC, 1986b).

4.7 Nonionizing Radiation

In response to a Department of Labor request to evaluate a series of articles in the popular press reporting various health effects from exposure to electric and magnetic fields, CIRRPC ask ORAU to establish a panel of experts from the academic community to conduct an independent evaluation of the reported health hazards of exposure to extremely low-frequency electric and magnetic fields (ELF-EMF). In 1992, the academic panel released its report, "*Health Effects of Low-Frequency Electric and Magnetic Fields*" (ORAU, 1992; Special Report, 1993). The academic panel concluded that "…that there is no convincing evidence in the published literature to support the contention that exposures to ELF-EMF are demonstrable health hazards" (Special Report, 1993).

4.8 Radiation Compensation

Responding to a Congressional mandate under the 1983 Orphan Drug Act, the National Institutes of Health (NIH) published its report on radioepidemiological Tables relating "…the probability that certain cancers could result from prior exposure to radiation". CIRRPC participated in the review of the Tables prior to their publication and in the development of a "screening" methodology, based on the Tables, for the Department of Veterans Affairs (VA) to use in evaluating the potential merit of claims of injury (OSTP, 1995). Science Panel Report No. 3, "*Report of the National Institutes of Health Ad Hoc Working Group to Develop Radioepidemiological Tables*" was published in 1986 (CIRRPC, 1986a).

4.9 Federal Radiation Research Agenda

In early 1984, the Department of Veterans Affairs (VA) requested CIRRPC to conduct a scientific review and evaluation of the feasibility of conducting an epidemiological study to determine the health status of veterans exposed to low-level ionizing radiation at sites of temporarily increased ionizing radiation. By Public Law 98-169, VA was required to determine the feasibility of conducting a scientifically valid study of the long-term adverse health effects of exposure to low-level ionizing radiation during military service in Japan or at nuclear weapons test sites (OSTP, 1995). CIRRPC Science Panel Report No. 1 "*VA Health Assessment of Veterans with Military Service at Sites of Temporarily Augmented Ionizing Radiation*" was transmitted to the VA Administrator by Dr. Keyworth on November 8, 1984 (CIRRPC, 1984).

4.10 Public Information and Education

The need for improvements in public information and education was raised in the 1986 report on the identification of Federal radiation issues. This issue had two distinct components. The first was the inadequacy of communications and interactions among the Federal agencies, the scientific community, the public, and various segments of the media on understanding ionizing and nonionizing radiation. The second component concerned the reduced flow of scientists trained in radiation from the academe to the Federal and industrial sectors (OSTP, 1995). In May 1991, CIRRPC conducted a workshop on Public Education to provide information for the development of a coherent and coordinated Federal policy on Public information on radiation and its health effects (OSTP, 1995). The Policy Report "*Balancing Radiation Benefits and Risks: The Need for an Informed Public*" was published in 1994 (CIRRPC, 1994).

4.11 Emergency Preparedness

Responding to large-scale nuclear events that could result in the release of vast amounts of radioactivity and the disruption of normalcy requires comprehensive planning not only to avoid preventable harm to public health and welfare, but also to enhance the capability to learn from the experience. CIRRPC produced two reports related to the development of such plans. The first examined the consequence of nuclear war on agriculture, and second dealt with planning for follow-up research on human health effects, in the event of a nuclear accident (OSTP, 1995). Science Panel Report No. 7, "*Planning for Human Health Effects Research in the Event of a Nuclear Accident*" was published in 1990 (CIRRPC, 1990). As stipulated in the Panel's charge, scenarios associated with nuclear warfare were not discussed.

4.12 Food Irradiation

The need for alternative methods for disinfestation of food commodities due to banning of carcinogenic or mutagenic chemical fumigants and other chemicals used for pathogen and pest control was one of the early concerns raised by CIRRPC representatives. Only one processing technology is available that is 100% effective in destroying the pathogenic bacteria responsible for the millions of cases of food-borne illnesses reported annually: cold pasteurization, i.e., food irradiation (OSTP, 1995). An article on this issue by the CIRRPC Chairman was published in 1996 (Young, 1996).

5. What Made CIRRPC a Successful Model?

The success of CIRRPC in the 11 years since it was chartered was due to many factors (Young, 1995). First, for an interagency committee to function effectively, it must meet the tests of continuity, competency, and consensus. In CIRRPC's case, its continuity over 11 years allowed it to be nationally and internationally recognized as the focal point for US Federal interagency radiation activities. The key to earning this recognition was the availability of a Secretariat consisting of a small, full-time professional staff and a neutral facility. Second, the Science Panel gave CIRRPC the competency and the credibility necessary to ensure that the best science was provided for the resolution of issues

addressed by CIRRPC. The various policy and science panels established often had the difficult tasks of resolving and coordinating agencies policies and responses to issue dealing with radiation. These panels and subsequent reports that were produced represented CIRRPC's efforts to seek a common position on issues of national significance and interest. Lastly, it was important that CIRRPC was chaired by a member of OSTP, an independent chair reporting to the Executive Office of the President, not to an agency. Of great concern by the Federal scientific community was the loss of competency and credibility to address the science that was and is occurring today, and that does not portend well for the ability of our Federal agencies to provide advice or for the future use of radiation technology for the benefit of our society (Young, 1995).

6. Why Was CIRRPC Closed?

The issue of "consensus" speaks to the necessity and the willingness of all agencies to use interagency mechanisms to resolve issues, and clearly most Federal agencies have a vested interest in participating in the process. In the last years of CIRRPC (1994 & 1995), unfortunately, the Committee was not able to achieve this consensus. The Federal Radiation Council guidance authority, which was provided by the Atomic Energy Act and was transferred to the Environmental Protection Agency Administrator by the President's Reorganization Plan in 1970, had become a tool for independent action without consensus, rather than for cooperation in addressing radiation issues (Young, 1995).

In May 1995, Walchuk published a note on "CIRRPC Being Phased Out" in The Health Physics Society's Newsletter (Walchuk, 1995). Walchuk cited a February 10, 1995 letter from John H. Gibbons, Assistant to the President for Science and Technology, to CIRRPC Chairman, Dr. Alvin L. Young:

"Under your able leadership CIRRPC has produced a number of highly referenced documents and provided a forum for the resolution of often contentious policy and scientific issues. However, a number of factors have led to a recent examination of CIRRPC as the appropriate body to coordinate radiation matters among agencies, evaluate radiation research, and provide advice on formulation of radiation policies. The creation of the National Science and Technology Council as the Administration's mechanism for addressing interagency science and technology issues, the October 1994 General Accounting Office report on nuclear health and safety, and our efforts to create a government that works better and costs less are some of those factors" (Walchuk, 1995).

There were other issues involved in the decision to discontinue CIRRPC. The most likely issues were that CIRRPC was seen by EPA as critical of some of EPA's proposed standards in the Safe Drinking Water Act. When the Office of Management and Budget (OMB), Executive Office of the President, asked CIRRPC to look into the disagreement between EPA and its own Science Advisory Board's (SAB) Subcommittee on Radiation regarding the agency's proposed drinking water regulations for radionuclides, CIRRPC agreed with the position of the SAB and recommended that EPA "give further attention to resolving…scientific issues in a manner that establishes a credible scientific base for its proposed regulation" (CIRMS, 1995). Lastly, CIRRPC's position on ELF-EMF did not support a draft

EPA report on the carcinogenicity of EM fields, nor was it in agreement with allegations made in the popular press (Special Report, 1993; Walchuk, 1995). It also became apparent that the major Federal agencies concerned with radiation policy matters zealously guarded their Congressionally mandates to advise the President on policy (CIRMS, 1995).

7. Conclusion

For over a decade, CIRRPC earned unique success as a committee where both radiation and policy issues could be examined in a manner and environment that gave all interested agencies equal opportunity to provide input to and participate in the processes and activities of the committee. Perhaps the most useful functions of CIRRPC over the 11 years of its existence was the communications that occurred at the monthly Science Panel meetings. Technical representatives from major agencies freely discussed their programs and research plans. This forum no longer exists, and this lack of communication in the Federal sector will become apparent with time. At this time, what remains of agency coordination on radiation issues rests with the Interagency Steering Committee on Radiation Standards (ISCORS), made up of EPA (Chair), Nuclear Regulatory Commission (NRC), DOE, and the Department of Defense (DoD). Thankfully, the National Council on Radiation Protection and Measurement (NCRP), and the Council on Ionizing Radiation Measurements and Standards (CIRMS) continue to be available to the Federal Government, the public, and the industry.

Acknowledgement

The author was the Chairman of CIRRPC from 1984-1995, and much of the text about CIRRPC was taken from the Final Report prepared at the direction of the Chairman in September 1995. The author would like to acknowledge the contributions of the many individuals who constituted the membership of CIRRPC, its panels and subpanels, and Secretariat. The high standard of dedication and professionalism demonstrated by the hundreds of men and women representing our Federal agencies is an outstanding tribute to the radiation protection community of the United States.

Reference

CIRMS. (1995). Final Meeting of the Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) held on August 14, 1995. *The Council on Ionizing Radiation Measurements and Standards (CIRMS) Newsletter*, *2*(2), 1, 3.

CIRRPC. (1984). *Science Panel Report No. 1, VA Health Assessment of Veterans with Military Service at Sites Temporarily Augmented Ionizing Radiation*. Available from DOE Office of Scientific and Technical Information (OSTI), Identifier 5415688.

CIRRPC. (1986a). *Science Panel Report No. 3, Report of the National Institutes of Health Ad Hoc Working Group to Develop Radioepidemiological Tables*. ORAU Report available from NTIS, Accession No. PB86-210200.

CIRRPC. (1986b). *Science Panel Report No. 4, Radon Protection and Health Effects*. ORAU Report available from NTIS, Accession No. PB86-210192.

CIRRPC. (1986c). *Policy Report, SI Metric Radiation Units*. ORAU Report available from NTIS, Accession No. PB87 199386.

CIRRPC. (1990). *Science Panel Report No. 7, Planning for Human Health Effects Research in the Event of a Nuclear Accident*. Report ORAU 90/H-84 (available from NIST).

CIRRPC. (1994). *Policy Report, Balancing Radiation Benefits and Risks: The Need of an Informed Public*. Report ORAU 94/F-29 (available from NIST).

CIRRPC. (1995). *Science Panel Report No. 10, Neutron Quality Factor*. Report ORAU 95/F-29 (available from NTIS).

EPA. (2019). *Federal Guidance for Radiation Protection*. The Environmental Protection Agency, Washington, DC, USA.

Flemming, A. S. (1959). The Federal Radiation Council. *Public Health Reports, 74*(12), 1107-1108.

Mills, W. A., Flack, D. S., Arsenault, F. J., & Conti, E. F. (1988). *A Compendium of Major US Radiation Protection Standards and Guides: Legal and Technical Facts*. Report ORAU 88/F-111 (available from NTIS).

NAS/NRC. (1990). *Health Effects of Exposure to Low Levels of Ionizing Radiation "BEIR V"*. National Academy Press, Washington, DC, USA.

NCRP. (1987). *Ionizing Radiation Exposure of the Population of the United States*. NCRP Report No. 93. National Council on Radiation Protection and Measurements, Bethesda, MD, USA.

ORAU. (1992). *Health Effects of Low-Frequency Electric and Magnetic Fields*. Prepared by ORAU for CIRRPC, Report ORAU 92/F8 (available from NTIS).

OSTP. (1995). *Final Report of the Committee on Interagency Radiation Research and Policy Coordination, 1984-1995*. Office of Science and Technology Policy, Executive Office of the President, Washington, DC 20506, USA. Available as ORAU Report 95/F-30, National Technical Information Service (NTIS), US Department of Commerce, 5285 Port Royal Road, Springfield VA 22161, USA.

Palmiter, C. C. (1968). The Federal Radiation Council. *Public Health Reports, 74*(12), 1107-1108.

Special Report. (1993). Health Effects of Low-Frequency Electric and Magnetic Fields. *Environ Sci Technol*, *27*(1), 42-51. https://doi.org/10.1021/es00038a004

Walchuk, M. (1995). CIRRPC Being Phased Out. *The Health Physics Society's Newsletter*, *XXIII*(5), 1, 4.

Young, A. L., & Dix, G. P. (1988). The Federal approach to radiation issues. *Environ Sci Technol*, *22*(7), 733-739. https://doi.org/10.1021/es00172a607

Young, A. L. (1995). *Memorandum to Dr. John H. Gibbons, Assistant to the President for Science and Technology, Office of Science and Technology Policy*. From Dr. Alvin L. Young, Chairman,

Committee on Interagency Radiation Research and Policy Coordination. Subject: The CIRRPC Final Report. September 18, 1995.

Young, A. L. (1996). Food Irradiation: After 30 Years, Where Do We Stand: A Government Perspective. *Environ Sci Pollut Res*, *3*(2), 88-90. https://doi.org/10.1007/BF02985496

Young, A. L. (1999). Commentary on the Dimming of the Atomic Future. *Environ Sci Pollut Res*, *6*(2), 61-63. https://doi.org/10.1007/BF02987544