Released 11/3/77

DOCUMENT RESUME

02794 - [A1993071] (~~Restricted~~)

[Environmental Protection Agency's Role in Protecting the Public and the Environment from Nonionizing Radiation Exposure]. CED-77-95; B-166506. July 6, 1977. 5 pp.

Report to Rep. John E. Moss, Chairman, House Committee on Interstate and Foreign Commerce: Oversight and Investigations Subcommittee; by Elmer B. Staats, Comptroller General.

Issue Area: Environmental Protection Programs: Environmental Protection Standards (2201); Consumer and Worker Protection: Standards and Regulations Adequacy and Timeliness (902).
Contact: Community and Economic Development Div.
Budget Function: Natural Resources, Environment, and Energy: Pollution Control and Abatement (304).
Organization Concerned: Environmental Protection Agency.
Congressional Relevance: House Committee on Interstate and Foreign Commerce: Oversight and Investigations Subcommittee.
Authority: Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.).

Nonionizing radiation has become a national concern because of the rapid increase in its use and its potential harm to public health. Findings/Conclusions: The Environmental Protection Agency's (EPA's) requested 1978 budget for nonionizing program activities is approximately $1 million, including $200,000 for environmental measurements and $830,000 for biological effects research. The Agency's program includes measurement of the general environment and calculation, measurement, and evaluation of specific types of sources. EPA has performed 25 field measurement studies since 1973. No detrimental effects have been observed in the general population exposed to nonionizing radiation from environmental sources, but demonstrable effects have been observed from chronic low-level exposure. A decision as to the need for protection standards for population exposure will not be made until March 1978. (DJM)

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-166506

JUL 6 1977

The Honorable John E. Moss
Chairman, Subcommittee on Oversight
and Investigations
Committee on Interstate and
Foreign Commerce
House of Representatives

Dear Mr. Chairman:

In accordance with your request of May 18, 1977, we have identified the following chronology of major events pertaining to the Environmental Protection Agency's (EPA) role in the general problem of nonionizing radiation exposures involving public health and environmental protection. This information was obtained in discussions with EPA officials and from documents gathered during our ongoing review of EPA's radiation program activities.

INTRODUCTION

Nonionizing radiation is defined as radiation occurring in the electromagnetic wave spectrum from frequency ranges used by high-voltage, electrical power lines; radio communications; television broadcasts; and microwave equipment--including radar, microwave ovens, microwave transmission towers, satellite communications, and medical diathermy devices--and from visible, infrared, and ultraviolet light--including sunlight, lasers, sun lamps, and high intensity lamps. EPA estimates the potential threat to persons and equipment from nonionizing sources has risen dramatically since 1945, when environmental nonionizing radiation levels were very low. Radiofrequency and microwave sources alone are estimated to be increasing by 15 percent annually.

Nonionizing radiation has become a national concern because of the rapid increase in its use for industrial, communication, and consumer applications, and because of its potential harm to public health. It is a major concern especially with the low-level exposure, because

--the harmful environmental levels are not known,

--the number of sources is rapidly increasing, and

--the controversy over low-level radiation effects is heightened by the fact that the U.S. standard for extended human occupational exposure to microwave radiation is 1000 times greater than that used by the Soviet Union.

There are two principal categories of hazards which may be associated with nonionizing radiation, namely the thermal and nonthermal effects. The thermal effects, which result from temperature increases in tissues, occur at high radiation levels and can result in burns to the skin and cataracts, retinal damage, and temporary sterility. The nonthermal effects do not result in visible physical damage but show some evidence of nervous system, behavioral, and physiological alterations. It is in this range that current biological effects research is being emphasized. There is also a classification of nonthermal effects (called interference effects) which result in interference with the operation of electronic equipment. Interference effects can result in physical injury when they involve disruption of cardiac pacemakers, telemetering devices in hospitals, and critical communications used in aircraft guidance and police, fire, and rescue activities.

EPA's concern with environmental nonionizing radiation arises from two exposure situations. One is related to the relatively high levels of exposure in the immediate vicinity of individual high-powered sources, such as satellite communications, airport radars, broadcast antennas, industrial process applications, and military electronic applications. The other cumulative situation is related to low-level exposures from the superposition or overlapping of radiation from many sources. Both of these situations can result in exposure of large populations to significant ambient levels of nonionizing radiation. However, with respect to environmental effects, there is as yet no applicable standard for the control of the ambient level of nonionizing radiation resulting from either single sources or a combination of low levels from multiple sources.

FEDERAL PROTECTION ACTIVITIES

The problems associated with nonionizing radiation are the responsibility of a number of governmental agencies, each

having its own scope and level of effort. For example, the Department of Health, Education, and Welfare (HEW) is responsible for establishing performance standards to control radiation from electronic radiation-emitting products, such as medical diathermy or microwave devices; the Department of Labor, for occupational health and safety; and the EPA, for environmental and public health aspects. All Federal research activities concerned with the biological effects of nonionizing electromagnetic radiation are currently coordinated by the Office of Telecommunications Policy in the Executive Office of the President. In 1974 EPA stated that the concern over the level and effects of nonionizing radiation had not caused any single agency to consider nonionizing radiation as a priority issue, and even today there is no direct control of environmental exposures.

When the EPA was created by Executive Reorganization Plan Number 3 of 1970, the function of "establishing generally applicable environmental standards for the protection of the general environment from radioactive material," mandated by by the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.) was transferred from the Atomic Energy Commission (AEC) to EPA. Standards were defined by the act as "limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material." In contrast, regulatory authority was retained by the former AEC--now the Nuclear Regulatory Commission and the Energy Research and Development Administration--for implementing and enforcing environmental radiation standards established by EPA. EPA's ambient environmental responsibilities were to be comprehensive--applying to the total amount of radiation in the environment to which any member of the public might be exposed.

In addition, broad authorities for setting radiation standards were transferred to EPA from the former cabinet-level Federal Radiation Council, which advised the President on radiation matters that directly or indirectly affected man's health. The Council's primary responsibility was to provide guidance for all Federal agencies in formulating radiation standards. Thus, EPA gained authority to make recommendations to the President which if approved, would be published

as guidance to Federal agencies. This guidance would be implemented and enforced in the specific regulations of agencies, such as HEW, the Department of Transportation, Labor, and the Federal Communications Commission.

EPA's activities are divided between two offices, the Office of Radiation Programs and the Office of Research and Development. Standards development, environmental measurements, and environmental evaluation are conducted by the Office of Radiation Programs. Biological effects research is conducted by the Health Effects Research Laboratory, Research Triangle Park, N.C., which is part of the Office of Research and Development. Environmental exposure data is collected, evaluated, and compared to known effects and research results to assess needs for criteria, guidelines, or standards to control exposure.

EPA's requested 1978 nonionizing program activities budget is approximately $1 million including $200,000 for environmental measurements and $830,000 for biological effects research. Its program objective is to determine the health and environmental impact of nonionizing radiation in order to assess the need for establishing standards for environmental levels and providing guidance for controlling environmental exposures.

EPA's environmental nonionizing radiation program includes measurement of the general ambient environment and calculation, measurement, and evaluation of specific types of sources. Data on ambient environmental levels in urban areas is being collected and studied so that population exposure can be computed. EPA has performed 25 field measurement studies since 1973. Although no detrimental effects have yet been observed in the general population exposed to nonionizing radiation from environmental sources, such as television, radio, and radar, EPA research has observed demonstrable effects from chronic, low-level exposure in laboratory studies. Furthermore, EPA states this emerging data is beginning to confirm results reported internationally, particularly by the Soviet Union. EPA is directing its research toward verifying this preliminary data in fiscal year 1977. In fiscal year 1978, an effort will be directed at determining the effects of broader exposure levels and frequencies, and at determining potential effects of low-level, chronic exposures.

PROGRAM STRATEGY AND UNCERTAINITIES

In its latest program statement of May 1976, EPA identifies three major program uncertainties to be overcome in the nonionizing radiation area, including the determination of

--existing ambient environmental levels and their rates and patterns of growth,

--criteria which can be used to specify acceptable environmental levels, such as thermal stress, nonthermal health effects, interference with electronic life support systems, and interference with television and radio reception, and

--the existence of nonthermal effects, which are detrimental to public health and welfare.

An EPA official stated that a decision on the need for protection standards for population exposure to nonionizing radiation will not be made until March 1978, and Federal guidance development, if determined to be necessary, by April 1979. At the present time, EPA believes that protection guidance will probably be necessary, based on currently available data.

As discussed with your office, we are preparing a report to the Congress on EPA responsibilities and efforts to set radiation protection standards and Federal guidance. We will provide you with a copy of the report when it is issued.

Sincerely yours,

Comptroller General
of the United States