

# The drive to regulate electromagnetic fields

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*In the United States, states and localities are imposing regulations, and industry is seeking action by the Federal government*

## SPECIAL REPORT

### ELECTROMAGNETICS HAZARDS

A few years ago, the electronics and communications industries were more than content that, in the United States, there were no compulsory regulations limiting human exposure to electromagnetic (EM) fields. In the view of many industry spokesmen, the dangers of such fields were minimal in any case. Today many corporations and trade groups, ranging from broadcasters to radar manufacturers, are urgently demanding that the Environmental Protection Agency (EPA) or some other national agency set up standards.

The reason for this shift is rooted in large part in actions by state and local lawmakers. In the past 18 months, Massachusetts and New Jersey, among other states, and even individual towns, have begun either to consider or actually to impose their own regulations, some as strict as or stricter than the only existing U.S. national standard, the voluntary one set forth by the American National Standards Institute (ANSI). With the number of lawsuits and citizens' battles over EM fields increasing monthly, the electrical and electronics industry may face a morass of 50 or more sets of contradictory state and local regulations. Thus, there is growing demand for national regulation.

There is still an ongoing scientific debate over the real hazards from EM fields and where the standards protecting people from these hazards should be set—although progress toward a consensus has been made and the EM-field standards of most countries seem to be converging slowly toward rough agreement. In 1980, for example, the U.S. ANSI standard allowed an 8-hour exposure to 10 000 microwatts per centimeter squared at 100 MHz, while the Soviet standard allowed only 5 mW/cm<sup>2</sup>, a two-thousandfold gap. Today the new ANSI standard has lowered the allowable power density for such duration and frequency to 1000 mW/cm<sup>2</sup>, while the Soviets have increased their standard to 25 mW/cm<sup>2</sup>, closing the gap to fortyfold [Fig. 1].

While the entire population is exposed to some degree to EM fields produced by the vast array of electrical devices in modern society, at frequencies ranging from dc to 300 gigahertz, the range of exposure is great. The vast majority of the public are rarely exposed to power densities above a few nanowatts per centimeter squared, far below the most stringent standards anywhere in the world. Some occupational groups, such as personnel on naval warships and broadcast-station workers, have exposures falling between the Soviet and ANSI standards and would thus be most affected by where an occupational standard is set. Finally, one occupational group, the workers in the plastics and other industries in the United States who use radio-frequency heat sealers (industrial devices that employ RF radiation for heating), are exposed to radiation not only above the revised ANSI standard, but also in many cases above the old ANSI standard.

Paradoxically, while there is growing support for a standard to protect the public, which is rarely exposed to even moderate

levels of EM fields, there is little pressure for a similar compulsory standard to protect employees at their work places, where the highest exposures occur. At present, no such compulsory standard exists in the United States, and the Occupational Safety and Health Administration (OSHA) appears unlikely to promulgate one.

Even the setting of national regulations for the general public will not be simple. The bureaucratic machinery for regulation setting is slow and cumbersome; there are many conflicting economic interests pulling on the regulatory process; the Reagan administration takes a dim view of regulations in general and a number of different agencies are involved [see "EM-field standards and how they are made," p. 70]. In addition, accumulating evidence of the biological effects of electromagnetic fields may be outdated existing standards, such as the present ANSI, which is itself already undergoing a review.

To find out how the efforts to promulgate regulations in this field are progressing, *Spectrum* sponsored a special panel meeting on June 13, 1983, in Boulder, Colo., in conjunction with the annual conference of the Bioelectromagnetics Society, an interdisciplinary organization dealing with the biological effects of electromagnetic fields. The participants [see "List of

#### List of participants

##### Chairman:

*Henry J.L. Rechen*, former deputy director, Division of Electronic Products, National Center for Devices and Radiological Health, Food and Drug Administration, Rockville, Md.

##### Panelists:

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*Arthur W. Guy*, director, Bioelectromagnetics Research Laboratory, School of Medicine, University of Washington, Seattle.

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