



Paul Brodeur

MICROWAVE OVENS

Cooking with Your Fingers Crossed

Back in December of 1971, the Electromagnetic Radiation Management Advisory Council—a nine-member panel established by the President's Office of Telecommunications Policy—issued a report on the potential health hazards of radiowaves and microwaves. The Council stated that "The electromagnetic radiations emanating from radar, television, communications systems, microwave ovens, industrial heat-treatment systems, medical diathermy units, and many other sources permeate the modern environment, both civilian and military." The Council declared that "This type of man-made radiation exposure has no counterpart in man's evolutionary background," and that "Power levels in and around American cities, airports, military installations and tracking centers, ships and pleasure craft, industry and homes may already be biologically significant." The Council also warned that "the consequences of undervaluing or misjudging the biological effects of long-term, low-level exposure could become a critical problem for the public health, especially if genetic effects are involved."

As it turned out, this ominous warning went almost unnoticed and unreported at the time it was delivered, and was totally disregarded by the military-electronics industry complex that has been largely responsible for the incredible proliferation of microwave-emitting devices throughout the nation in recent years. Subsequently, the military-industrial complex was given a free hand by the Congress to continue its twenty-year cover-up of the health hazards posed by microwave radiation. Meanwhile, thanks to the promotional wizardry of the electronics industry, the word "microwave" became virtually

synonymous in the public mind with a relatively new type of cooking oven.

Because of the American consumer's well-known craze for convenience items, the sales of microwave ovens have exceeded the wildest dreams of their makers. More than eight hundred thousand were purchased in 1975; nearly a million were bought in 1976; and well over a million were sold last year. Today, they are outselling gas and electric ranges, and by 1980, according to industry projections, there will be a microwave oven in one out of every four American homes. Ironically, now that the public is finally and belatedly beginning to be aware of the adverse biological effects of microwave radiation, the question most commonly asked about the microwave problem is whether microwave ovens are safe.

In order to address this question, it is important to know that all microwave ovens leak radiation. In fact, under regulations promulgated, in 1970, by the Food and Drug Administration, microwave ovens are allowed to leak radiation. Following purchase by a consumer, a microwave oven is allowed to leak radiation having a power intensity of five milliwatts per square centimeter within two inches of the oven face. The FDA calls this a performance standard. Industry calls it an emission standard. It might better be called a malfunction standard.

Let us assume that all microwave ovens will adhere to government regulation, and that none of them will leak in excess of the five milliwatt standard. What is known about this level of intensity? To begin with, it is one-half of the recommended ten milliwatt guideline for occupational and civilian exposure to

microwaves, which was proposed by the military-industrial complex twenty years ago, and which has been in effect in the United States ever since. However, it is *five hundred* times greater than the occupational exposure limit in the Soviet Union and other European countries, and *five thousand* times higher than the recommended exposure level for the general population of those nations. Moreover, it is a level that was established (like the ten milliwatt guideline) without a shred of scientific evidence that it is biologically safe over an extended period of time. In fact, it is a level that has been used in a number of experimental animal studies to produce changes in the bioelectric function and biochemistry of the brain, changes in the blood-forming system, alterations of behavior, and effects on cell division and chromosomes.

Even more alarming is the fact that microwave ovens are allowed under law to leak a level of radiation only one and a half orders of magnitude below the level that produced a highly significant increase of leukemia in mice in a study that was conducted fifteen years ago by researchers at the University of California at Berkeley. Incredible as it may seem, this study, which was financed by the Air Force, was never repeated for lack of further funding. Thus the minimal level, or threshold dose, for microwave-induced leukemia in mice was never determined. This, in turn, meant that the potential for low-level microwave radiation to produce leukemia in humans was ignored during the very period in which a vast amount of microwave equipment was being manufactured and installed. Small wonder that the FDA has recently referred to the fifteen-year old study of leukemia in mice as

"the most discomfoting report in the available literature" concerning microwaves. Discomfoting, indeed! On the basis of such a finding, it would be difficult, if not impossible, for the FDA to approve the introduction into the marketplace of a new food additive or a new medical drug. In other words, if microwave radiation were a chemical, it would probably be banned.

What does the microwave oven industry have to say about all this? In spite of a large and ever-growing medical literature on the non-thermal effects of microwaves, industry insists that the only hazard to worry about is the heating (or cooking) of tissue caused when the whole human body is exposed to levels of radiation high enough to produce a significant rise in core temperature. Industry claims that the intensity of radiation leaking from microwave ovens diminishes so rapidly that it cannot cause such harm. To support this contention, industry offers the analogy that whereas heat from a candle can burn you at a distance of an inch, you can scarcely feel it a foot or more away. What industry neglects to mention is that, unlike heat from a candle, microwave radiation penetrates instantly and deeply into tissue; that microwave workers have been injured by levels of radiation they could not feel in the slightest; and that the average person has no way in the world of knowing how much or how little radiation a microwave oven may be leaking.

One of the most blatantly misleading claims put out by the microwave oven industry is that there is not a single injury on record from microwave oven emissions. The fact is that dozens upon dozens of such injuries have been reported, including the development of cataracts, skin burns, and sterility. In addition, it has recently come to light that two women, who worked with microwave ovens for three years in the Foods Department of a California High School, have simultaneously developed uterine cancer. It is also true that industry has settled out of court to the advantage of plaintiffs who brought suit alleging that they had been injured by radiation leaking from microwave ovens. Many similar lawsuits are either in court or being prepared. Indeed, some observers are predicting that the microwave oven industry will soon be swamped by an avalanche of litigation. In the face of all this, industry continues to assure people that when they use a microwave oven they are exposed to radiation for only brief and infrequent periods when the oven is in use. Such assurance not only overlooks the fact that leaking ovens are merely one of many sources by which people are routinely exposed to microwaves, but appears to suggest that a little bit of radiation now and again won't

hurt anybody. One used to hear that about X-rays.

As it happens, many of these erroneous claims have been demolished in a report that was prepared by the FDA's Bureau of Radiological Health in 1976. This report describes the unsuccessful attempt of General Electric Company—a leading manufacturer of microwave ovens and electronic weaponry—to contest the Bureau's recall of some 36,000 ovens that were suspected of leaking radiation in excess of the five milliwatt standard. It can be obtained by writing to the Hearing Clerk, FDA Office of Compliance, Parklawn Building, Rockville, Maryland, 20857, and asking for document 76P-0213.

Prior to a compliance hearing on the matter, it was determined that within a short time after purchase, a significant number of the GE ovens were not only leaking radiation exceeding the emission standard, but that some of them were leaking up to five and ten times that amount. GE promptly requested an exemption from the standard. During the hearings, the company was required by law to furnish proof that the leaking ovens would not "create a significant risk of injury, including genetic injury, to any person." According to the FDA, it failed to do so.

The FDA hearing report contains information that ought to be of great interest to owners and prospective owners of microwave ovens. It says, for example, that in order to maintain exposure below the level considered safe for workers in the Soviet Union one must remain about four feet from an oven emitting at the limits of the five milliwatt standard. This means, of course, that anyone using such an oven would have to stand even farther away in order to maintain exposure below the level considered safe for the general population of the Soviet Union.

The FDA report points out that information is lacking about the possible effects of microwave radiation on people susceptible to injury because of pre-existing health conditions. Since it is well known that the eyes are particularly sensitive to microwave injury, does this not present a potential problem for oven users with ophthalmological ailments? Since it is also well known that microwave radiation can adversely affect cardiac pacemakers, do microwave ovens not present a possible hazard to the wearers of such devices? And since many European investigators have shown that microwave radiation can affect the cardiovascular system, is there not a disturbing question about the safety of microwave ovens for older people with heart trouble?

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The FDA report contains the startling revelation that twenty years ago, a high-ranking military physician who coordinated and directed the government's microwave research program described the proposed ten milliwatt guideline as being only "arbitrarily safe." The report then proceeds to destroy the ethical and scientific basis upon which the grossly inadequate American microwave standard was set. "One can establish an exposure level arbitrarily," it reads. "One need only to select a level—any level—and write an order establishing the legitimacy of that level. But a safety level cannot be established arbitrarily, for a level which is safe is so by virtue of the fact that it has been determined to be free of harmful consequences through observation—in animals, or humans, or both. Thus, biological safety cannot be determined by arbitrary decision."

For this reason, the report declares that the ten milliwatt guideline represents "a directed verdict rather than the culmination of objective and unbiased scientific judgement." And it goes on to say that the use of such arbitrary levels by the General Electric Company in its petition for exemption from the five-milliwatt microwave oven performance standard "is clearly without any sound biological basis relating to the absence of a risk of injury." All well and good. But what about the fact that the five-milliwatt oven performance standard, by the admission of a number of people in the FDA who helped to establish it, was arrived at simply by arbitrarily halving the already "arbitrarily safe" ten milliwatt guideline?

For raising hackles on the neck of the average microwave oven owner, however, nothing in the entire two-hundred page FDA report can beat the paragraph that appears on page 52 of Attachment A. "The possibility that cumulative effects of microwave radiation can occur has been raised through research, and cannot be ignored," it reads. "The potential exists for exposure of young and very young people repetitively as ovens come into common usage, and effects may result. Substantial follow-up of exposed populations will be needed to examine the question of such effects."

Does that last sentence mean what it appears to mean? Can the FDA really be saying that people exposed repeatedly to the radiation leaking from microwave ovens may, in effect, be test animals in a vast biological experiment whose results will only be known at some future date?

Yes, that is what the FDA is saying, all right. Take it or leave it. In short, cook your hamburgers, America, and keep your fingers crossed.

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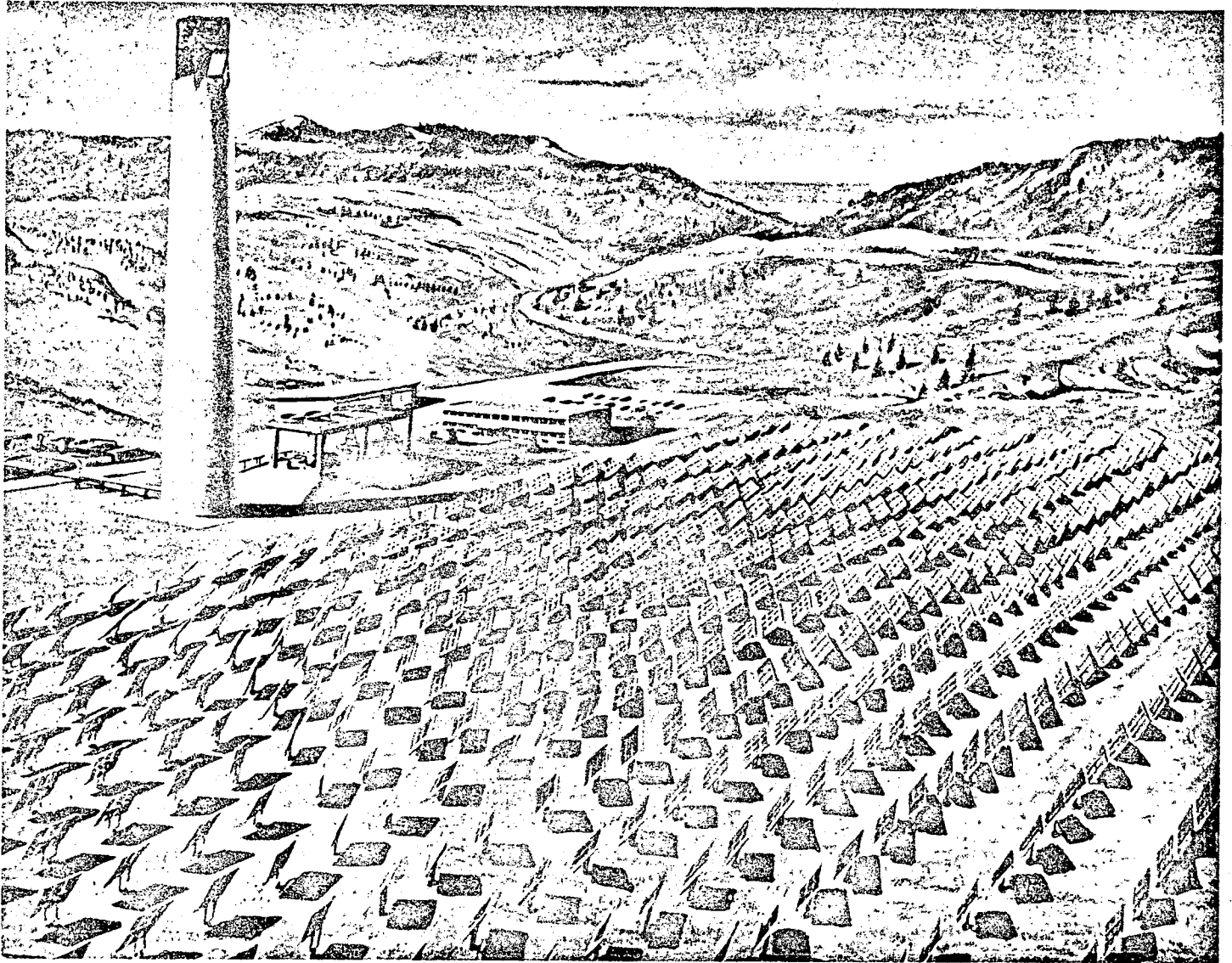
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An artist's concept of the world's first solar electric power plant depicts a "power tower" amid a field of mirrors or "heliostats."

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