MICRO WAVE NEWS

Vol. I No. 1 A Monthly Report on Non-Ionizing Radiation January 1981

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COMING UP

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- First Long-Term, Low-Level Microwave Exposure Study
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MICROWAVES IN MOSCOW

At its August 26, 1980 meeting, the Electromagnetic Radiation Management Advisory Council (ERMAC) concluded that an investigation, such as the formal study of the health of Americans exposed to microwave radiation in the U.S. embassy in Moscow, would be pointless. Without dissent, members of ERMAC agreed that, based on current knowledge, there are no scientific or theoretical grounds to predict potential health impacts of the Moscow signal.

A consequence of the ERMAC finding may well be that the State Department will do no further epidemiological research on the 1,827 employees who worked at the embassy during the 22 year period when the Russians irradiated the upper floors with low levels of mostly continuous and some pulsed microwaves. As Stephen Cleary of Virginia Commonwealth University, an ERMAC member, explained, the sample population is too small and the dose too low for anything but a grave risk to show up, and therefore any money allocated to such research could be better spent elsewhere. One ERMAC member went so far as to say that he would not hesitate to expose himself or his family to those levels of microwaves found in the embassy.

ERMAC is an advisory committee to the Administrator of the National Telecommunications and Information Administration, Mr. Henry Geller.

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ANSI News

Meeting Scheduled

There will be a meeting of the C95 Committee on Radio Frequency Radiation Hazards of the American National Standards Institute (ANSI) on Thursday, February 26, 1981 at the ANSI headquarters in New York City (1430 Broadway). The main purpose of the meeting is to seek final approval of the new subcommittee IV standard on radiofrequency and microwave safety levels. Other business will include the new standards on measurements (subcommittee I) and hazard signs (subcommittee II/III).

Standard Nears Completion

The ANSI safety standard went out for C95 Committee vote last July. Although the standard was accepted by a majority vote of the Committee three important organizations withheld their approval: the Bureau of Radiological Health, the Environmental Protection Agency, and the Electronic Industries Association.

At a meeting in Bethesda in late October, the subcommittee was able to satisfy BRH objections and it is now very likely that the Bureau will cast a positive vote on the new standard. While an attempt was also made to win EIA's approval, it is not yet clear how EIA will vote. Apparently EPA does not intend to vote at all.

Microwave News will present an in-depth look at the new ANSI standard in a forthcoming issue.

GOVERNMENT

CONGRESS

The Congressional Research Service of the Library of Congress has updated its issue brief on "Radiation Health and Safety Issues of Congressional Interests." The brief written by Christopher Dodge of the Science Policy Research Division covers both ionizing and non-ionizing radiation and includes a listing of legislative authorities, federal regulatory authorities, pending legislation, hearings, and a chronology of events. (Brief Number IB77062, October 23, 1980.)

AGENCIES

Air Force

The Air Force wants to develop new and improve existing hardening techniques for its systems exposed to a nuclear electromagnetic pulse (EMP). See *Commerce Business Daily*, November 7, 1980.

Bureau of Radiological Health (FDA)

BRH promulgated a final rule amending the performance standard for microwave ovens in the *Federal Register* on November 28, 1980 (45 *FR* 79028). The rule, which becomes effective on November 30, 1981, deletes the error limit and effective aperture requirements for instruments used to detect leaks from microwave ovens.

The rule was on the agenda of the Technical Electronic Product Radiation Safety Standard Committee (TEPRSSC) meeting held on December 3-4 in Washington.

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BRH proposed a performance standard for microwave diathermy products in the July 29, 1980, *Federal Register* (45 *FR* 50359). A summary of the comments on the standard submitted to BRH will appear in our February issue.

Department of Commerce

The Commerce Department ruled in early December that the Toshiba Corporation of Japan sold countertop microwave ovens at prices so low that they were unfair and violated the Tariff Act. The case has been forwarded to the US International Trade Commission, which will determine whether Toshiba ovens injured domestic production. If the ITC makes such a finding, penalty duties will be assessed.

According to the December 3 *Federal Register* (45 *FR* 80157) notice, ovens made by the Matsushita Electric Industrial Company, the Sanyo Electric Company, and the Sharp Corporation were not dumped in the American market. The four companies accounted for 98% of the 740,000 ovens imported into the United States from Japan in 1979 at a value of $149 million.

Environmental Protection Agency

EPA sponsored a workshop on RF measurements in Las Vegas last November 3-5. Thirty government officials and a limited number of outsiders held intensive discussions on the current status of measuring electromagnetic fields. According to Richard Tell of EPA, the workshop organizer, "This was the first time all the instrumentation experts from the government were in the same room at the same time."

The participants agreed to two sets of recommendations:

1. That a group, such as the American National Standards Institute (ANSI), should set the following standards for broad band RF survey instruments: a) minimum, uniform reporting requirements of performance characteristics for existing instruments; b) minimum testing procedures for evaluating instrument performance; and c) performance characteristics for future instruments.

2. That standardized measurement techniques be developed based on: a) existing instrumentation, b) applicable safety standards, and c) specific exposure situations.

The second set of recommendations arose from the lack of uniformity in the way measurements are taken.

The recommendations will be published at a later time, though the form of publication has yet to be decided, perhaps an EPA technical report or a journal article.

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The Nonionizing Radiation Surveillance Branch of EPA is providing all the Agency's regional offices with a new Holaday electric field probe to permit local surveys of radiofrequency levels. According to Branch Chief, Dave Janes, "We are providing only the training and equipment, the time and resources devoted to this are up to each individual regional office."

EPA is also buying higher frequency probes: one of five or six Narda probes will be lent to a regional office when requested as soon as they are delivered by the manufacturer. A single field intensity meter and associated antennas which can identify the frequency of a particular source will also be available for loan. A four day training course for regional personnel was held by EPA in mid-December in Las Vegas.

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Department of Energy

The DOE's Office of Electric Energy Systems held its annual contractors review meeting on the biological effects of electric fields from overhead transmission lines in Washington DC last November 18-19. Researchers from about a dozen on-going projects in the multi-million dollar program reviewed their progress.

The DOE program is now focused on AC work, but in the years ahead the emphasis will change to DC lines.

For a copy of the abstracts presented at the November meeting contact: Mr. Alec O. Bulawka, US DOE/EES, Mail Stop 3344, 12th and Pennsylvania Avenue, NW, Washington DC 20461, (202) 633-8638.

Federal Communications Commission

At the end of January, the FCC will issue a statement in response to the comments received on its 1979 Notice of Inquiry (NOI) [44 *FR* 37008, June 25, 1979] concerning the biological effects of radiofrequency radiation.

The FCC has decided not to issue any interim radiation standards, according to Robert Cleveland of the Commission's Technical Planning Staff. But the FCC will participate in the rulemaking proceedings of other agencies on RF issues. The statement will include a summary of the some 25 comments submitted to the FCC in response to the NOI.

Cleveland said that the FCC issued the NOI to meet its duties to promote safety under the Communications Act, and to satisfy its responsibilities under the National Environmental Policy Act.

National Cancer Institute

NCI has issued a request for proposals for the synthesis and evaluation of radiosensitizers, chemicals which selectively sensitize hypoxic (oxygen deficient) tumor cells to radio-therapy. A three year project is planned. RFP NCI-CM-17485 is available from Maria Decker, NCI, Treatment Contracts Section, Blair Building, Room 228, NIH, Bethesda, MD 20205.

National Institute for Occupational Safety and Health

The schedule for the NIOSH criteria document on radiofrequency and microwave (RF/MW) radiation is still slipping. Drafts of the document were released in 1979, but were withdrawn due to unfavorable reviews. NIOSH is now aiming for a substantially shorter document, one that is less encyclopedic with more critical analysis. NIOSH's consultants are in the process of evaluating the RF/MW biological data. This phase of the operation is going slowly, and the agency cannot proceed until it is completed. A review draft may be finished by the spring.

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The NIOSH procurement office in Cincinnati has issued a request for quotation [RFQ 81-12; November 14, 1980] for the writing of two television scripts on the health risks associated with Video Display Terminals (VDT's).

NIOSH, BRH, OSHA

A team from NIOSH, BRH and OSHA is developing a bulletin on control technologies for dielectric heaters, including RF sealers.

Preliminary tests indicate that shielding can have a significant effect on both the magnitude and direction of the impinging field. The team is not yet ready to make firm recommendations on control technologies.

The joint bulletin is due to be out in late Spring.

National Telecommunications and Information Agency

The Electromagnetic Radiation Management Advisory Council (ERMAC), the advisory committee to NTIA, is anticipating holding a meeting at the end of January or early February in Washington.

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The BENER Task Force report, "Nonionizing Electromagnetic Radiation Safety: A Program of Coordinated Federal Activities Related to Biological Effects of Nonionizing Electromagnetic Radiation (0-300 GHz)," was published last summer, but has yet to receive any official attention.

Dr. Howard Clark of the National Bureau of Standards who served as the Task Force chairman hoped that the report would provide "a frame of reference for examination of the various agency programs and budgets that relate to the coordinated federal BENER program," and would be "useful to federal agencies in planning or describing their individual activities as related to a common goal."

The Task Force was set up by Henry Geller, the Administrator of NTIA at the request of Dr. Frank Press, the President's science advisor. Nevertheless, the report has not been officially forwarded to Press, nor does it seem to be a planning tool of the individual agencies involved in bioeffects research.

Occupational Safety and Health Administration

Bob Curtis of OSHA's Salt Lake City office organized a training session for two members of each of OHSA's ten regional offices to teach them how to measure radiofrequency and microwave radiation levels in the workplace. As a result of the December 3-4 sessions, held in Salt Lake City, workers will have a greater opportunity to check their on-the-job exposures to non-ionizing radiation.

Helping Curtis were Michael Larsen and Alfred Owyand of OSHA and Edward Aslan of Narda.

Radiation Policy Council

The US Radiation Policy Council, the interagency group created by the President in February 1980, has issued its "Progress Report and Preliminary 1981-1983 Agenda." (No. RPC-80-001, September 30, 1980).

The Report concentrates on ionizing radiation to the virtual exclusion of non-ionizing radiation. Beyond intending to grapple with general radiation policy which may (or may not) spill over

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BIOLOGICAL RESEARCH

Frey Reworks BBB Data

Allan Frey of Randomline Inc. believes he has resolved some of the contradictions in the experimental results of the blood brain barrier (BBB) research. Writing in the November 1980 issue of the *Bioelectromagnetics Society Newsletter*, Frey argues that the use of inappropriate statistical analysis explains why many researchers erroneously concluded that microwaves do not change the permeability of the BBB.

At least three teams of researchers, including one led by Frey himself, have shown that microwaves can cause certain dyes to pass through the BBB into the brain. In one of the most significant studies, Oscar and Hawkins discovered that pulsed 1.3 GHz radiation could change the permeability of the BBB at average power densities of only 0.03 mW/cm² (*Brain Research, 126*, 281, 1977).

However, three groups of scientists cast doubt on these results by reporting no microwave effects on the BBB for various exposure conditions. Frey has taken the published data of two of the groups, and, by applying what he thinks are more appropriate statistical tests, found that the opposite conclusions hold: they demonstrate increased permeability. One set of results by Merritt *et al.* now supports Frey's original paper, and another by Preston *et al.* confirms Oscar and Hawkins' work. Frey also speculates that the third group, Spackman *et al.*, may have also used inappropriate statistical analyses and a faulty experimental design.

As Frey concludes: "The supposed conflicting and controversial data actually are quite consistent and indicate that something is happening in the brain under low intensity microwave energy exposure."

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New Review Article

Richard Lerner has published a comprehensive review of current research on health effects of non-ionizing radiation, with special emphasis on low-level effects, in the December 1980 issue of *IEEE Spectrum*: "RF Radiation: Biological Effects." The article also details some of the controversy surrounding the new ANSI standard.

EPA Funds Teratological Study

The Environmental Protection Agency's Health Research Laboratory has awarded Dr. Mary Ellen O'Connor and Dr. Robert Strattan of the University of Tulsa a contract to study the teratological effects of microwave radiation.

The two-year, $230,377 study will consist of exposing mice *in utero* throughout the gestation period with 2450 MHz continuous wave radiation. The irradiation will stop after they are born. The experiment will begin with exposures to power levels of 30 mW/cm²; the levels will decrease to 10, 1, and 0.1 mW/cm² until no effects are observed. The mice will be monitored for fetal weight and developmental abnormalities.

Dr. O'Connor is with the Department of Psychology and Dr. Strattan is with the Electrical Engineering Department.

New Idea about Cataract Formation

A new explanation for cataract formation has been developed by a group of physiologists at Rush University in Chicago (*Science, 209*, 1007, August 29, 1980). The group has rejected the view that the lens of the eye is a homogeneous mass. Instead, based on a combination of biophysical techniques and mathematical models, the scientists have proposed that the interior cells of the lens have imperbeable membranes that block the entry of small ions. These fibrous cells can stop the flow of sodium and water into the lens' interior, thereby preserving its volume and transparency.

Microwave Hearing

How do people hear pulsed microwaves? The mechanism for the perceived buzzing or clicking sound is still a mystery; various hypotheses continue to be proposed, rejected, and defended. In a tart exchange of views in *Science* (*209*, 1143, 5 September 1980), two opposing camps reaffirmed their positions. One group led by C.K. Chou of the University of Washington Medical School maintains that hearing results from a tiny pressure wave in the head when the radiation pulse is converted to thermal energy. Allan Frey and Elaine Coren of Randomline, Inc. continue to offer the hypothesis that microwave hearing is the result of the thermoacoustic expansion within the cochlea, the small snail-shaped region of the inner ear.

GOVERNMENT *(continued from p. 3)*

to the non-ionizing portion of the spectrum, the RPC agenda promises little attention to microwave, radiofrequency, or ELF radiation.

Included in the report are summaries of the RPC public meetings held across the country during 1980, and the public comments submitted to the Council.

Three of the public comments address non-ionizing radiation:

- AFL-CIO, Food and Beverage Trades Department: strengthen occupational exposure standards for microwave and radiofrequency radiation from microwave ovens and sealing equipment, and radiation emanating from video display terminals. (p. E-12)
- Natural Resources Defense Council: Examine both ionizing and non-ionizing radiation since many of the problems that have hindered past work on ionizing radiation are also obstacles in the study of non-ionizing radiation. (p. E-4)
- Raytheon Corporation: Encourage EPA to develop a mandatory Federal standard on exposure of the general public to non-ionizing radiation or recommend a definition of current consensus standards (ANSI C95) by Congress as a mandatory national standard until formal Federal standards are developed. Ensure active participation by federal agencies in legitimate efforts of public education in the area of non-ionizing radiation. (p. E-8)

If you want to be on the RPC mailing list, write to: US Radiation Policy Council, Room 3026, New Executive Office Building, 726 Jackson Place, NW, Washington, DC 20503.

RF Radiation, A New Tool in Cancer Treatment

Radiofrequency radiation is a promising weapon against cancer, according to a December 1980 *IEEE Spectrum* article. "RF Therapy for Malignancy" explains how this treatment works and describes equipment design and function, tissue models used in research, and various hyperthermia methods.

Radiofrequency induced heating of tissue (42 to 43.5°C) is used alone or in conjunction with radiation (ionizing) therapy or chemotherapy to treat malignancies. A range of frequencies is used; higher ones—up to 2450 MHz—are easier to focus than the lower frequencies which can penetrate more deeply into the body. Because solid tumors generally have poor blood circulation, a tumor can be selectively heated without significantly increasing the temperature of surrounding, healthy tissue. The authors state that for localized treatment, there are no serious side effects from radiofrequency hyperthermia.

VDT's

The *Columbia Journalism Review* will feature a story on VDT's in the newsroom in its January-February issue. The article looks at both the health hazards associated with the machines and the reporting of this story by the press.

Electrotherapy Controversy

New York Magazine, in a two-part article that ran November 23 and December 1, detailed the controversy over the use of low-level electricity for bone healing.

The story began as a profile of Arthur Pilla, a chemical engineer at Columbia University. Pilla, who claimed to have played a major role in developing the electrical technology to treat fractures that previously would not heal, piqued the reporter's interest by claiming that the device was now being tested for its efficacy in treating cancer and that human applications could start within the year.

Dr. Andrew Bassett, a doctor at Columbia's medical school, cautioned that Pilla was overstating the prospects and further, downgraded Pilla's contributions in their research.

Bassett had worked with Dr. Robert Becker, then at the VA Hospital in Syracuse, New York, to show that stress applied to any bone is translated into electricity. Bassett's later cooperation with Pilla resulted in a practical, non-invasive electrical coil device, which Pilla and another colleague patented. They all formed a private corporation, Electro-Biology, Inc. of Fairfield, New Jersey with the financial backing of Wall Street entrepreneurs.

Zimmer-USA, Inc. and Telectronics Proprietary Ltd. offer other bone-growth stimulators, although Electro-Biology's is the only one which does not require implanting an electrode under the skin.

Dr. Bassett received more than $1 million in government grants in the course of his research. The writer, Lally Weymouth, raised questions about transferring medical research paid for by public funds to profit-making private companies. She noted that the government gets a share of Zimmer-USA royalties because its product was underwritten by the Navy.

New Reports

Two major studies of the Department of Energy's SPS system are nearing completion. Each will contain an analysis of the impact of microwave radiation on human health and the environment.

One study by the National Research Council (NRC) is due to be completed by the end of June 1981, with a draft report by early January 1981. The other by the Congressional Office of Technology Assessment (OTA) was due to be published by the end of January 1981, but is running late.

NRC

The Environmental Studies Board (ESB) of the NRC appointed a Committee on Satellite Power Systems to provide an independent review of DOE's assessment of the SPS concept. Towards this end, the ESB organized a "Workshop on Mechanisms Underlying Effects of Long-term, Low-level, 2450 MHz Radiation on People." A workshop summary, prepared by Christopher Dodge of the Science Policy Research Division of the Library of Congress, was released last fall. (See box for conclusions of workshop participants.)

OTA

The two-year OTA project was requested by the House Committee on Science and Technology. The completed study will compare the impacts of beaming energy from collecting satellites by lasers, microwaves, and reflected light. With respect to microwaves, the study will look at both the DOE reference system and a solid state system which would use lower power densities and smaller rectenna sites.

SRI

Last summer, SRI International completed a study for the Environmental Protection Agency, "An Assessment of the Potential Impact of Microwave Radiation from a Solar Power Satellite." This then became the basis for a chapter in the DOE report, "Environmental Assessment of the Satellite Power System (SPS) Concept Development and Evaluation Program (CDEP)," prepared by Anthony Valentino of Argonne National Laboratory (No. DOE/ER-0069, August 1980).

CONCLUSIONS OF SPS-NRC WORKSHOP

A. There are relatively little microwave health and bioeffects data available of direct relevance to the radiation parameters of the proposed SPS. What data are available are difficult to evaluate in terms of a potential health impact of the SPS.

B. There is no presumptive evidence in the data available that exposure of the general public to 0.1 mW/cm² or lower at the frequency of 2450 MHz generated by the SPS will result in any health decrements. However, because a number of functional phenomena of known significance have been reported in response to exposure to low-intensity microwaves, further research and evaluation...is necessary in order to decrease present uncertainties about potential low-level microwave health effects.

Georgia Power Challenged on Microwaves

A group of 27 residents of rural Clayton, Georgia, have filed suit in county court to prevent Georgia Power Company from erecting a 180-foot microwave tower on top of nearby Screamer Mountain. Citizens Against Microwaves, led by homeowner David Kraft, brought the case in September, shortly after the Rabun County Commission approved the tower in a 2-1 vote before a packed hearing room.

The suit, which names the power company and the two county commissioners who approved the tower, charges that allowing Georgia Power to build on land seized by the county for nonpayment of taxes is a violation of covenant, will create a health hazard and constitutes an improper disposal of county property. *Atlanta Weekly*, the Sunday magazine of the *Atlanta Constitution*, ran a long article on the controversy in its November 23, 1980 issue.

HBO Cancels Out

In late November, Home Box Office (HBO), Time-Life's subscription TV network, withdrew its application to build a satellite communications complex in Rockaway Township, New Jersey.

The HBO proposal was under intense scrutiny by the Rockaway Board of Adjustment which had to grant a variance before construction could begin. The Concerned Citizens' Committee of Rockaway Township was formed to oppose the HBO proposal. The Committee was worried about the siting of a major source of microwave radiation in a residential area, only 1000 feet from a neighborhood school. The Board had held 16 hearings since last spring, and another 30 were scheduled.

Edward Horowitz, HBO vice-president of studio and network operations, explained that while "the local Board was responsive and HBO was overcoming the local opposition, we could not afford the delay."

The cancellation will not hurt HBO's immediate programming. The Rockaway site would have provided the pay TV system with added flexibility. As for a new site, Horowitz said that HBO will look for suitable areas across the country: "The primary interest is in the New York-New Jersey Metropolitan area, but once away from here, it doesn't really matter where you go."

California OSHA

California's Occupational Safety and Health Standards Board has proposed a substitution in the State's General Industry Safety Orders on non-ionizing radiation. The standard remains at 10 mW/cm^2; the purpose of the change is to make it more enforceable. Cal OSHA held a public hearing on the proposal on November 19, 1980.

Dr. Daniel Cahill of the Environmental Protection Agency's Health Effects Research Laboratory in Research Triangle Park, North Carolina, has been awarded the Public Health Service Commendation Medal. Dr. Cahill, the Director of the Lab's Division of Experimental Biology was cited for: "Outstanding research and research management in the areas of ionizing and non-ionizing radiation health effects in the environment."

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Mays Swicord, Chief of the Electromagnetics Branch at the Bureau of Radiological Health, was awarded his doctorate last month from the Electrical Engineering Department at the University of Maryland. He completed the thesis: "Studies of Microwave Absorption in Liquids by Optical Heterodyne Detection of Thermally Induced Refractive Index Fluctuations" in November. The objective of the research was to develop a spectroscopic method, flow spectroscopy, to look at microwave absorption of specific molecules. Swicord investigated DNA and found enhanced absorption as predicted by E.W. Prohofsky of Purdue University.

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COMAR wants to make a movie about microwaves. **John Osepchuk** of the Raytheon Corporation and **Don Justesen** of the VA Medical Center in Kansas City, two active members of the Institute of Electrical and Electronics Engineers' (IEEE) Committee on Man and Radiation (COMAR), are exploring the idea of producing a 30-minute film on non-ionizing radiation for public television. The project is in its early stages of development and must still be approved by the IEEE. Once the go ahead is given, Dr. Osepchuk estimates that it will take a year and a half to complete.

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Over a hundred colleagues and friends of Professor **Herman Schwan** gathered at the University of Pennsylvania in Philadelphia last November 24-25, to wish him a happy 65th birthday.

Those who attended the two-day *Festschrift*, "The Interaction of Acoustical and Electromagnetic Fields with Biological Systems," funded by the Office of Naval Research, heard twenty presentations. The proceedings will be published in a special issue of *Bioelectromagnetics*, the Journal of the Bioelectromagnetics Society.

Professor Schwan is currently on sabbatical at the Max Planck Institute of Biophysics in Frankfurt, Germany.

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A profile of **Dr. Andrew Marino** of the Veterans Administration hospital in Syracuse, New York, "Law with a Spark," appeared in the September 29, 1980 issue of the *National Law Journal*. Marino, who is both a biophysicist and an attorney, does research on the bioeffects of ELF and at the same time is participating in various cases involving high voltage transmission lines. The article was written by Jill Jonnes.

MOSCOW *(continued from p. 1)*

Follow-Up Studies

If the State Department decides to discontinue formal follow-up studies of Moscow employees, the decision would be at odds with the earlier advice of Professor Abraham Lilienfeld of Johns Hopkins University who completed an epidemiology of the Moscow employees in 1978, and of the Senate Commerce Committee. Both urged the State Department to pursue the health studies.

Dr. Herbert Pollack, a medical consultant to the State Department, did say, however, that he and Dr. Charles Brodine were continuing to monitor those employees present during the period of maximum exposure (May 1975-February 1976). "We have a complete roster of all those exposed, and every time they get a medical check up, one of us reviews their complete medical history," Pollack emphasized.

"a follow-up would buy a sense of security."
— Lilienfeld

In a recent interview, Professor Lilienfeld agreed that from a scientific point of view he would not expect to see any deleterious effects at such low doses. But from a political and personal point of view, he felt that continued examinations would be a "prudent thing to do." "It's a matter of judgment," he said, "a follow-up would buy a sense of security." Professor Lilienfeld pointed out that the major costs had already been spent and future surveys would be comparatively cheap.

The ERMAC advice could have some effect on pending claims by former embassy workers. John Parker Hills, an attorney who is handling four claims, said that up to now the State Department has been basically "ignoring" him. Hills has two claims before the Workmen's Compensation Board and two before the State Department, one of which is a class action on behalf of all women irradiated in Moscow. According to Justice Department and Veterans Administration spokesmen, neither agency has any Moscow-related claims pending.

ERMAC took up the question of a follow-up to the 1978 epidemiology at the request of the State Department, which paid the expenses for the ERMAC meeting. In a January 16, 1980 letter to Henry Geller, the State Department asked whether there was any basis for continued study. Mr. Geller referred the matter to ERMAC. According to Pollack, the State Department is waiting for the ERMAC recommendation before responding to any Moscow claims.

Before debating the merits of a follow-up investigation, ERMAC heard R.C. Mallalieu of Johns Hopkins University's Applied Physics Laboratory describe the results of his attempt to reconstruct the radiation levels on the upper floors of the embassy. According to Mallalieu's report ("A Model of the Microwave Intensity Distribution Within the US Embassy in Moscow, 1966 to 1977," No. FS-80-166, JHU-APL, August 1980), the most intense microwave exposures occurred between May 1975 and February 1976, with average levels of continuous wave radiation of 3.5 to 5.0 uW/cm² and average peak intensities due to multiple reflections of 7 to 10 uW/cm². The largest recorded power density was 24 uW/cm². From 1966 to 1975, the average signal strengths for those rooms with the greatest exposure was about 1.5 uW/cm² with maximum levels of 4 uW/cm², though there were transient peaks of as high as 20 uW/cm². Areas more distant from the radiation sources had microwave levels of less than 0.1 uW/cm². In February 1976, protective shielding was installed which reduced all exposures to 0.1 uW/cm² or less. Based on these data, the State Department has estimated that over a 22 year period, about 240 employees were exposed to average power levels of about 1.5 uW/cm² for about 2 hours during the workday. ("Exposure of Model Personnel," State Department, August 26, 1980.)

Lilienfeld Study

The Lilienfeld epidemiology failed to identify any major differences in either mortality or morbidity between Moscow embassy personnel and a comparative population working in other embassies in Eastern Europe. Lilienfeld had only minimal information on the signal strength inside the embassy building, though he did know that the maximum exposure took place during the nine months ending in February 1976. The radiation surveys were classified until after his study was released. Since only a short time has elapsed between the period of maximum exposure and his study, Lilienfeld recommended that "it would seem desirable that this particular study population should be contacted at periodic intervals, of 2 to 3 years, within the next several years, in order to ascertain if any health effects would appear." He went on: "it would be important to develop a surveillance system for deaths in the entire study population to be certain that no mortality differences occur in the future and to monitor the proportion of deaths due to malignancies, especially among the women."

"every time they get a medical check up, one of us reviews their complete medical history," — Pollack

In an April 1979 report, the Senate Committee on Commerce, Science and Transportation "urged" that the State Department pursue this Lilienfeld recommendation, especially for those people exposed between June 1975 and February 1976. ("Microwave Irradiation of the U.S. Embassy in Moscow") The Committee noted that its recommendation reflected a "precautionary attitude."

A subcommittee made of Dr. Marylou Ingram (chairwoman), Professor Cleary, Professor Mary Ellen O'Connor and George Wilkening wrote up the ERMAC recommendations, which are now circulating among the full ERMAC membership. A statement is expected to be released in January.

CONFERENCES

NEWS

BEMS

More than 300 people attended the second annual meeting of the Bioelectromagnetics Society in San Antonio, Texas, last September. Some 160 papers were presented providing a rich blend of new research findings and open discussion.

In the months ahead, *Microwave News* will feature a series of articles on some of the important topics covered in San Antonio. The first in this series, "Microwave-Drug Synergy," will appear next month. Later, we will run a piece on Professor A.W. Guy's long-term experiment which began last fall at the University of Washington in Seattle.

VDT's

A one day conference on "Health Hazards of VDU's" was held at the Human Sciences and Advanced Technology Research Group, Department of Human Sciences, Loughborough University in Leicestershire, England on December 11, 1980. (VDU is the European equivalent of our VDT.) Among the papers presented were two reports of skin rashes among VDT operators in England and Norway.

IMPI

The International Microwave Power Institute (IMPI) held a symposium on "The Washington Impact: How It Affects Microwave Users" on November 13-14, 1980. A host of government officials briefed the more than two dozen attendees on what the government agencies are doing.

The proceedings of the symposium will be available from IMPI for $40.00 for members and $50.00 for non-members. Order from: IMPI, 211 East 43rd Street, New York, NY 10017.

PROCEEDINGS

Now Available:

Proceedings of a Workshop on Thermal Physiology, held in Rockville, Maryland, March 29, 1979. Edited by Dr. T. Whit Athey, Bureau of Radiological Health, sponsored by the Radiofrequency and Microwave Committee of the Interagency Regulatory Liason Group. Dated March 1980. Available from BRH, Rockville, MD 20857.

Non-Ionizing Radiation, Proceedings of a Topical Symposium held in Washington D.C., November 26-28, 1979, sponsored by the American Conference of Governmental Industrial Hygienists. Order from: ACGIH, P.O. Box 1937, Cincinnati, OH 45201.

Proceedings of the International Symposium, *Electromagnetic Waves and Biology,* held in Jouy en Josas (outside Paris) France, June 30-July 4, 1980. Send $40.00 to Dr. A.J. Bertaud, CNRS, 2 rue H. Dunant, 94329 Thiais, France.

CALENDAR

• January 12-16: *National Radio Science Meeting,* University of Colorado, Boulder, CO. Sponsored by the US National Committee of IEEE Societies. Contact: Center for Conferences and Management/Technical Programs, 970 Aurora Avenue, University of Colorado, Boulder, CO 80302.

• February 16-17: *Treatment of Cancer by Radiofrequency and Microwave Thermotherapy,* Princess Kaiulani Hotel, Honolulu, HI. A short course arranged by the Bioelectromagnetics Corporation of Rockville, MD. Fee: $495. Contact: Dr. S.S. Stuchly, Department of Electrical Engineering, University of Ottawa, Ottawa, Canada K1N6N5.

• April 13-15: Annual *Conference and Trade Show of the International Association of Satellite Users,* Washington Hilton Hotel, Washington DC ($95 IASU Members; $195 Others). Contact: A. Fred Dassler, IASU, 6845 Elm Street, Suite 710, McLean, VA 22101.

• June 9-12: 16th Annual *Symposium of the International Microwave Power Institute,* Royal York Hotel, Toronto, Canada. Contact: IMPI, 211 East 43rd Street, New York, NY 10017.

• June 15-19: *IEEE and URSI Symposium,* Bonaventure Hotel, Los Angeles, CA. Sponsored by the Antenna and Propagation Society and the Microwave Theory and Techniques Society of the IEEE and four Commissions of URSI. Contact: IEEE, 245 East 47th Street, New York, NY 10017.

• June 30-July 4: *International Symposium on Biomedical Thermology,* Palais de la Musique et des Congres, Strasbourg, France. Includes sessions on hyperthermia in cancer treatment (July 3) and bioelectromagnetics (July 1). Simultaneous translation in English, French, and German. Contact: Dr. M. Gautherie, Laboratoire de Thermologie Biomedicale, Faculte de Medicine, Universite Louis Pasteur, 11 rue Humann, 67085 Strasbourg, France.

• August 10-12: 3rd Annual *Bioelectromagnetics Society Meeting,* Washington DC. Contact: BEMS, P.O. Box 3651, Arlington, VA 22203.

• August 10-19: 20th *General Assembly of the International Union of Radio Science (URSI),* Hyatt Regency Hotel, Washington DC Includes a series on "Interaction of Electromagnetic Waves with Biological Systems," on August 13-14, chaired by Professor Saul Rosenthal of Polytechnic Institute of New York, and an "Open Symposium on Millimeter and Submillimeter Waves." Contact: Mr. Richard Y. Dow, Organizing Committee of URSI General General Assembly, National Academy of Sciences. 2101 Constitution Avenue, NW, Washington DC 20418.

• August 19-21: 3rd Annual *Satellite Communications Users Conference,* Regency Inn, Denver, CO ($145 pre-paid; $195 at the door). Contact: SCUC '81. Satellite Communications Magazine, 3900 S. Wadsworth Blvd, Denver, CO 80235.