

ASSESSMENT OF HEALTH EFFECTS FROM EXPOSURE TO POWER-LINE FREQUENCY
ELECTRIC AND MAGNETIC FIELDS

Marija Hughes, M.L.S., M.P.H.,
U.S. Department of Labor, OSHA, TDC
200 Constitution Avenue, NW
Room N2315
Washington, DC 20210

I am commenting on the National Institute of Environmental Health Sciences Working Group Report's two chapters: Visual Display Terminal Operators and Electromagnetic Hypersensitivity.* I am commenting because some important publications have been omitted and should be included. For the past ten years I have been surveying medical and other scientific literature. The findings have been published in Computer Health Hazards v. 1 and 2, and Computer, Antenna, Cellular Telephone and Power Lines Health Hazards, v. 3. These publications have received international recognition and should be included. Additional publications which have been omitted and should be included are:

Ryan, P., w. Lee, B. J. and A. J. McMichael.
Risk factors for tumors of the brain and meninges: results from the Adelaide adult brain tumors study.
International Journal of Cancer 51:20-27, 1992.

Brett, E. M.
"Pediatric neurology," in Comprehensive Neurology, 2nd ed.
New York, Raven Press, 1991. p. 359.

Goldhaber, M. K., M. R. Polen and R. A. Hiatt.
Risk of miscarriage and birth defects among women who use visual display terminals during pregnancy.
American Journal of Industrial Medicine 13:695-706, 1988.

There were four international conferences Work With Display Units (WWDU) that dealt with the computer injuries. The Fourth International Scientific Conference, Milan, Italy 1994 dealt with vision problems.

All these reports have been reported in my works Computer Health Hazards v. 1 and 2, and Computer, Antenna, Cellular Telephone and Power Lines Health Hazards, v. 3.

*This paper does not reflect an opinion of any U.S. federal agency.

The Report does not even mention vision problems.

Cheu¹ says: "Computer eyestrain is real. More PC users suffer vision woes than wrist injuries. Millions of Americans suffer from computer-related eye problems... that generate \$1.15 billion in medical costs each year. The American Optometric Association says that 12 million Americans visit eye doctors each year because of computer-related problems or one out of every five who come in for an eye examination."

The second chapter I will comment on is Electromagnetic Hypersensitivity 4.6.6. The chapter is out of place, since it is under "carcinogenicity in animals." It should be moved to some other place.

Electromagnetic hypersensitivity is a progressive disabling disease associated to electronic equipment. While researchers have been aware of this disease for more than two decades (Dodge, 1971), electromagnetic hypersensitivity has received little attention from the scientific community. It has many names: electrical sensitivity, electrical-hypersensitivity, electrically injured, electric intolerance, electric allergy and electromagnetic sensitivity. Several million people all over the world suffer from electromagnetic hypersensitivity. Some people with severe disease are unable to work. Compounding the medical problems is the uncertainty as to whether the medical profession will recognize their illness, whether disability boards will award their claims, whether their health insurance will pay for their treatment, and whether their employers will provide an atmosphere in which they may continue to work.

Electromagnetic hypersensitivity is usually accompanied by chemical sensitivity. Electromagnetically hypersensitive people react to computers, TV's, stereos, VCRs, fluorescent lights, telephones, electronic security systems, electric tools, electric sewing machines, electric heaters and electric trains. Electromagnetically hypersensitive people are usually sensitive to perfumes, pesticides, solvents, cleaning fluids, petrochemical products, diesel fumes and formaldehyde.

U.S. Department of Labor, Occupational Safety and Health Administration lists seventeen computer-emitted chemicals. Some of the chemicals are: cresol, phenol, toluene and xylene. The list is published in 59 Federal Register 15968 (Apr. 5, 1996).² The Swedish researchers found 65 chemicals in computers. The article entitled: Secret IBM report: screens leak poison. Data Varlden (The Computer World) 43:1, 3, Oct. 25, 1990.³ (The article is in the Appendix of Computer Health Hazards, v. 2.)

The electromagnetically hypersensitive people react to airborne particles and certain foods also.

Since 1980, Swedish scientists have documented skin symptoms as the most common results of computer sensitivity. These include sensations of burning, prickling, itching, stinging, redness, swelling, rashes, tightness and dry skin. 4, 13, 23 erythema, dermatitis with blisters, swollen eyes and lids, and mucosal injury in the cheeks and soft palate also occur. 5-6

VDT dermatitis is not rosacea. Dr. Bjorn Lagenholm, Chief of Dermatology at the Karolinska Hospital in Stockholm, says ordinary rosacea seldom appears anywhere other than on the face. He reports redness and dilated blood vessels on the face, neck, chest, back, and even under the clothing of computer operators. He found, besides elastosis solaris, remarkable in very young computer operators, an absence of elasticity under the epidermis. He attributed these injuries to ultraviolet light and X-rays. ⁷

The Report incorrectly states that Dr. Johansson did not find any biological changes. In conclusion p. 238 of Experimental Dermatology 3:234-238, 1994, he states "It is evident from our preliminary data that biological changes are present in the patients claiming to suffer from screen dermatitis." He also states that the high number of mast cells present may explain the clinical symptoms of itch, edema and erythema. ⁸

The skin symptoms are permanent and extremely painful. They are painful when it is hot, as well when it is cold. They never go away. The face is extremely painful and cannot be shielded properly. The fingers are also very painful. When cold both fingers and feet are swollen and painful.

The skin is the largest organ and is very dry and painful most of the time.

The literature points this out and I know that it is correct from personal experience.

The progressive symptoms are:

Cardiopulmonary (shortness of breath, painful lungs, breathing difficulties, heart palpitations)

Gastrointestinal (those of radiation enteritis: abdominal pain, diarrhea, metabolic impairment, malabsorption, weight loss)

Musculoskeletal (muscle pain, joint pain, aggravation of arthritis)

Neurological (headaches, spasm of eyelids, depression, memory difficulties, inability to concentrate, electric shock sensation)

It is a progressive illness. Neurological symptoms are particularly devastating and progressive.

The electromagnetic hypersensitivity has been confirmed by four double blind positive laboratory provocation studies. The Report lists only one Dr. William Rea's.

"In 1981 Cabanes and Gary⁹ studied sensitivity of 75 healthy males to 50 Hz EF's and found that 3 of them (4%) were able to perceive surprisingly low exposures (0.35 kV/m), 4(5.33%) sensed 1 kV/m, while the threshold for 50% of the group was established for 7 kV/m. Hypersensitivity to EFs was later confirmed by Choy, et al in 1986.¹⁰ and reconfirmed by Rea, et al.¹¹ who investigated persons which reacted to very low frequencies and reported distressing, irritating and/or cardiovascular symptoms during everyday use of electric/electronic equipment. Lability of vegetative nervous system and different shifts in function of cardiovascular system were confirmed."¹¹⁻¹² Szmigielski, et al.¹² studies 71 healthy volunteers and found 4 persons (5.6%) responded to EFs or current stimulation with significantly larger elongation of reaction time to AS or VS (90 kV/m).

The Report has downplayed the existence of electromagnetic hypersensitivity. Electromagnetic hypersensitivity is a devastating illness which does not have cure. The pain and suffering is beyond description.¹³ The literature is full of personal stories of people whose lives have been destroyed. They are unemployed, unable to live in a normal home, ill, some blind or totally disabled. Those people cannot afford any medical care. ^{7, 13-17}

The Report lists negative studies. The negative studies does not mean that the electromagnetic hypersensitivity does not exist.

There has been two Electromagnetic Hypersensitivity Conferences held in Copenhagen, Denmark, in 1993 and 1995. The Report does not even mention the international conferences. Also, there were two European Electromagnetic Hypersensitivity conferences in Bled, Yugoslavia in 1992 and Gratz, Austria in 1994.

My publications list electromagnetic hypersensitivity on:

Computer Health Hazards v. 2, pp. 40-42

Computer Health Hazards, v.1, pp. 22-23

Computer, Antenna, Cellular Telephone and Power Lines Health Hazards, v. 3, pp. 40-43

They also list publications from various international conferences.

There is a growing number of people suffering from electromagnetic hypersensitivity all the world. Miran Alcott was a telephone operator working for AT&T, the first American person who won her worker's compensation case.¹⁷ I was the first American case to win the Reasonable Accommodation case, and continue working without the use of a computer.⁶ Knave identified thousands of persons in Sweden with electromagnetic hypersensitivity.²³ Rea identified also several thousands of people with the sensitivity in the United States.

Electromagnetic hypersensitivity organizations research and support groups exist all over the world. They are in Germany, Norway, Sweden, England, Canada, Denmark, Australia, Yugoslavia and United States.²⁴

In conclusion, the chapter on VDT operators is particularly weak. The earlier computers leaked X-rays.¹⁹⁻²⁰ Workers who used these computers were exposed to X-rays and some of them are now suffering from electromagnetic hypersensitivity. Also, some important publications are missing like computer Health Hazards v. 1& 2 and Computer, Antenna, Cellular Telephone and Power Lines Health Hazards, v. 3 and should be included. As well as publications dealing with cancer (Ryan), reproductive hazards (Goldhaber) and epilepsy (Britt).

The Report downplays electromagnetic hypersensitivity. The Regional Director, Region 6, in a letter to Senator Phil Gramm of November 25, 1996 defines the illness as:

"Symptoms attributed to radio frequency exposure such as nausea, headaches, dizziness, pain in the eyes, ringing of ears, screeching and sizzling sounds, and irregular heartbeat are described collectively by the term, "electrosensitivity."²⁵

The electromagnetic disease is real. The scientific studies have documented the existence of this devastating illness. While the industry has made concentrated effort to deny the existence of the electromagnetic hypersensitivity. The scientific literature does not support the industry's position. Dodge described electromagnetic hypersensitivity in 1971²¹ and indicated that Russian physicians have also described the illness as "microwave illness."²² To date, this illness has not been recognized for insurance and workers' compensation claims. The worldwide introduction of computers and other electronic equipment makes it urgent that this disabling disease be given widespread attention by the scientific community. That the exposure limits be lowered, that we agree on a list of symptoms, assign ICD-9 code and develop treatment protocols. Findings are based on my investigation of the scientific literature, the results published in my books, Computer Health Hazards, v. 1 & 2 and Computer, Antenna, Cellular Telephone and Power Lines Health Hazards, v. 3.

1. Cheu, R. A.
Good vision at work.
Occupational Health & Safety 67:20-24, Sept. 1998.
2. U.S. Dept. of Labor. Occupational Safety and Health Administration.
Indoor Air Quality: Proposed Rule
Federal Register 59:15984, Apr. 5, 1998.
3. Secret IBM report: screens leak poison.
Data Variden (The Computer World) 43:1, 3, Oct. 25, 1990.
4. Cormier-Parry, M. L., G. V. Karakashian and J. W. Burnett.
Dermatologic manifestations in users of video display terminals.
Cutis 42:16, 1988.
5. Nilsen, A.
Facial rash in visual display unit operators.
Contact Dermatitis 8:25-28, 1982.
6. Hughes, M. M.
"Computer-related electromagnetic sensitivity: A new occupational hazard," in The Second Electromagnetic Hypersensitivity Conference, Copenhagen, Denmark, May 1995. pp. 33-50. Esp. p. 37, 49-50.
7. Nordstrom, G. and C. von Scheele.
"The dermatologist battle," in Sick From Computers. Stockholm, TCO-Tidrigen, 1989. pp. 10-16.
8. Johansson, O., M. Hilliges, V. Bjornhagen and K. Hall.
Skin changes in patients claiming to suffer from "screen dermatitis:" a two-case open fields provocation study.
Experimental Dermatology 3:234-238, 1994. Esp. 238.
9. Cabanes, J. and C. Gary.
La perception direct du champ electric.
International Conference on Large High Tension Electric System. CIGRE. 1981. CIGRE Report 233-08.
10. Choy, R. V. S., J. A. Monro and C. W. Smith.
Electrical sensitivities in allergic patients.
Clinical Ecologist 4:93, 1986.
11. Rea, W. J., Y. Pan, and E. J. Fenyves, et al.
Electromagnetic fields sensitivity.
Journal of Bioelectricity 10:241-256, 1991.
12. Szuba, M. and S. Szmigielski.
Change in reaction time to auditory and visual signals differentiates individual responses to short-term exposure to ELF electric fields and direct current stimulation.
Proceedings of the COST 244 meeting on Electromagnetic Hypersensitivity. Gratz, Austria: European Union, 1994. pp. 94-105. Esp. pp. 95, 96-97.

13. VDT health risks and hypersensitivity to electricity--the afflicted experience a grim reality.
Lakartidningen (Swedish Medical Journal) 87:45, 3751, 1990.
14. Knave, B.
The mysterious magnetic fields.
Working Environment 1:32-33, 1989.
15. Becker, R. O.
Cross Currents.
Los Angeles, Tarcher, 1990. pp. 249-252.
16. Soderlund, S.
Annalena Erikson--a living electric meter.
Working Environment 1:32-33, 1989.
17. Bureau of National Affairs.
"Workers' compensation claims--delaying tactics?" in VDT in the Workplace
Washington, D.C., The Author, 1987, p. 62.
18. Liboff, A.
EM sensitivity conference in Copenhagen, Denmark.
Microwave News 16, Sept./Oct. 1995.
19. Johanson, K.
Test your computer for X-rays.
East West 14, 1986.
20. Paulsson, L.
Radiation emissions from VDUS.
Work With Display Units, Stockholm, May 12-15, 1986.
Scientific Program and Abstracts Bulletin, #3, p. 10.
21. Dodge, C. H.
"Clinical and hygienic aspects of exposure to electromagnetic fields:
A review of Soviet and East European literature,"
in Biological Effects and Health Implications of Microwave Radiation,
Symposium Proceedings (Cleary, S. F., ed) Sept. 17-19, BRH/DBE
Report No. 70-72 (1970). pp. 140-149.
22. Sadcikova, M. N.
"Clinical manifestations of reactions to microwave irradiation in various
occupational groups," in Biological Effects and Health Hazards of
Microwave Radiation, Proceedings of an International Symposium Warsaw,
Oct. 15-18, 1973. 1974. pp. 261-267.
23. Knave, B.
Electric and magnetic fields and health outcomes--an overview.
Scandinavian Journal of Work, Environment and Health 20:78-89, 1994. (Special Issue:
24. Hughes, M. M.
-Computer, Antenna, Cellular Telephone and Power Lines Health Hazards, v. 3
Washington, Hughes Press, 1996. p. 115.

25. United States Environmental Protection Agency. Regional Director, Region 6.
Letter from Jane N. Saginaw, Regional Administrator
to Phil Gramm, United States Senator
November 25, 1996