

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

February 24, 1997

Lucinda Grant
Electrical Sensitivity Network
P.O. Box 4146
Prescott, AZ 86302

Dear Ms. Grant:

This is in response to your letter to me, dated January 23, in which you discussed your concerns that the Federal Communications Commission (FCC) is not adequately addressing the needs of persons who are "electrically sensitive." In that regard, I should mention that the FCC currently has before it 17 petitions for reconsideration of its original Report and Order adopting new guidelines for human exposure to radiofrequency (RF) energy. Some of those petitions also discuss the issues you raise, and all of the issues in the petitions are currently under consideration by the Commission. Final action is likely soon in response to these petitions.

With regard to your information that a "public hearing" will be held by the FCC on this issue, I can tell you that there are presently no plans for such a hearing. Furthermore, I am not aware of plans by any other federal agency to hold such a hearing.

The FCC's Report and Order emphasized that the FCC is not a health and safety agency. Therefore, we do not have the resources or expertise to independently investigate and pass judgement on claims of biological effects. Rather, we rely on guidance from such agencies as the Environmental Protection Agency and the Food and Drug Administration with respect to these issues. The new RF guidelines adopted by the FCC are based on recommendations of these agencies.

I hope this information will be helpful. If you have additional questions, you can also contact our RF Safety Program at: (202) 418-2464 or e-mail: rfsafety@fcc.gov.

Sincerely,



Robert F. Cleveland, Jr., Ph.D.
Office of Engineering & Technology

CHARLES E. SCHUMER
NEW YORK

2211 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-6616

DISTRICT OFFICES:
1828 KINGS HIGHWAY
BROOKLYN, NY 11229
(718) 627-9700

118-21 QUEENS BLVD.
FOREST HILLS, NY 11375
(718) 268-8200

90-16 ROCKAWAY BEACH BLVD.
ROCKAWAY, NY 11693
(718) 945-9200

Congress of the United States
House of Representatives
Washington, DC 20515

COMMITTEES:
JUDICIARY
BANKING AND
FINANCIAL SERVICES
WHIP-AT-LARGE

October 6, 1997

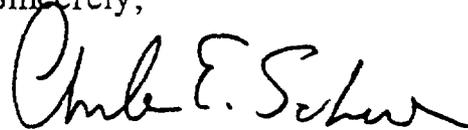
Lucinda Grant
Electrical Sensitivity Network
PO Box 4146
Prescott, Arizona 86302

Dear Ms. Grant,

Thank you for your powerful and moving letter about electricity sensitivity. I will work all the harder to keep the Doppler away from where people live, work and play.

All the best.

Sincerely,



Charles E. Schumer
Member of Congress

CES:jmk

The Electrical Sensitivity Handbook

*How Electromagnetic Fields (EMFs)
Are Making People Sick*

Lucinda Grant



Chemical and electromagnetic pollution — the residue of modern industrialization — show their price in the global escalation of cancer and environmental illnesses.

The American Cancer Society's publication Cancer Facts & Figures - 1993 predicts that one out of every three Americans now living will have cancer. Currently, one out of every five deaths is from cancer.²⁶

Note: Numbered references throughout the text indicate sources for further study.

(See Bibliography, page 89.)

This book is dedicated to
electrically sensitive patients worldwide.

Outstanding among
those patients who helped
with ideas for this book are those in
The Association for the Electrically and VDT Injured,
Post Office Box 15126,
10465 Stockholm, Sweden.

May we all find peace, health and happiness — everyone.

TABLE OF CONTENTS

Disclaimer	8
Electrical Sensitivity (ES) is Important for Everyone	9
Electrical Sensitivity Network.....	10
Terminology	12
What is Environmental Illness?.....	13
What is Electrical Sensitivity?.....	14
ES Statistics.....	16
What are the Symptoms of Electrical Sensitivity?	16
The Other ES Symptom.....	18
The Psychology of ES	18
The Causes of Electrical Sensitivity.....	20
Most Troublesome EMF Sources.....	30
Frequency-Specific EMF Sensitivity	30
Case Examples of Types of ES	31
Opinion on Symptom Effects	36
Diagnosis of Electrical Sensitivity	37
Sound Sensitivity.....	37
Weather Sensitivity	38
Sun Sensitivity.....	39
Light Sensitivity	41
Metal Sensitivity.....	42
Reactions to Watches	43
Reactions to People	44
Reactions to Amalgam Dental Fillings	44
Reactions to Geopathic Stress	45
ES Legal and Economic Tangles.....	49

Electrical Sensitivity Treatment Options.....	50
Improving the Environment	51
Natural Fiber Clothing	52
Metal Avoidance	52
Grounding.....	52
Product Warning.....	53
Antigen Therapy.....	53
Charged Water Technique.....	54
Salt Water Bath	55
Detoxification.....	55
Energy Balancing	57
Miscellaneous.....	59
Drug Intervention	60
What are Electromagnetic Fields (EMFs)?	61
The EMF Cancer Issue.....	62
Warning Signs of EMF Problems	64
What a Gaussmeter Will and Will Not Tell You.....	65
EMF Reduction in the Home.....	67
Endnote.....	71
Resource Guide	72
Information Resources	72
Medical Resources	72
Legal Resources	73
EMF Resources	74
Appendix	77
Computer Radiation Standards.....	77
MPR2 and TCO Standards.....	81
Magnetic Field Readings From Common Home Appliances	82

Electric and Magnetic Field Readings from U.S. High-Voltage Power Lines	83
Environmental Illness at the Worksite	84
Points to Consider for EMF Reduction in the Workplace	85
A Note to EMF Scientists.....	87
Bibliography	89
Index	99

Disclaimer

The author is an electrically sensitive patient, but not a medical doctor or scientist.

For your protection, seek respected medical or other appropriate advice prior to making any changes in your current program.

Electrical sensitivity is a new medical area. As more research and surveys are completed, facts about electrical sensitivity will become more clear and may change from the initial impressions presented in this book.

This document is intended to provide general information to the public about electrical sensitivity and electromagnetic fields to facilitate discussion and legislation in this area.

The author and the publisher are not responsible for any damage or loss of any kind occurring from information in this book, including errors and omissions. The information contained herein is only meant to suggest possibilities and cause the reader to seek proper reliable advice as pertains to his/her individual situation.

Electrical Sensitivity (ES) is Important for *Everyone*:

- ES shows that the body can be sensitive to very low electromagnetic field (EMF) levels, below those levels now considered safe.
- Cancer is primarily discussed as the main EMF health risk. When ES patients show an EMF reaction at 15-20 feet from a refrigerator, does that mean cancer could be promoted (or caused) at that distance also?
- Electrically sensitive patients have shown that external EMFs are biologically active and can interfere with the electricity of life processes, particularly the nervous system. EMFs may be neurotoxic.
- Electrical sensitivity can explain health problems many people are presently having for which they currently have no answers and no long-term relief.
- ES patient reactions represent the subtle nature of life and the EMF forces that control and maintain it.
- ES pinpoints the need for environmental regulation of EMF pollution in all its forms.

Electrical Sensitivity Network

The need for a national electrical sensitivity network, a support and advocacy group, is expressed in this letter reproduced in part from Network News, October/November 1994 (See EMF Resources, page 74.):

“People with electromagnetic sensitivity (ES) disorder often find themselves disabled, misunderstood, and unrepresented. There seems to be no group organized on a national level specifically to coordinate the needs of people with ES in the United States. Germany, Sweden, and Denmark do have such associations.

With these thoughts in mind and as an ES patient myself, I hope to help develop a list of resources and a list of ES patients interested in starting a group focusing on ES needs. Group goals could entail idea sharing, emotional support, and being heard as a group for proper representation under the Americans with Disabilities Act, and with federal and state agencies working with the injured and/or disabled.

A survey of ES patients indicating symptoms, patient profile, and most severe electromagnetic triggers, and coping methods, could give weight to the proper recognition of ES as a widespread U.S. illness. A major question is “How many people here have ES?”. In Sweden about 1,500 patients belong to their Association for the Electrically and VDT Injured.

People who develop symptoms which intensify near electrical appliances and other electromagnetic field sources find little consolation from general medical or scientific circles. Therefore, ES patients are frequently without proper documentation to pursue legal action, explain their symptoms to others, or retain/obtain suitable employment if affected in the workplace.

As a group, I hope we can make ES more understood and acknowledged as an illness/disability.”

For more information about this group now forming, contact Weldon Publishing,
Post Office Box 4146, Prescott, Arizona 86302.

Terminology

Electrical sensitivity (ES) is a modern illness of the technological age. A review of available literature reveals that ES has been known by the following terms:

- Electric Hypersensitivity
- Electrical Hypersensitivity
- Electrical Oversensitivity
- Electrical Sensitivity (ES)
- Electromagnetic Field (EMF) Hypersensitivity
- Electromagnetic Field Sensitivity
- Electromagnetic Hypersensitivity
- Electromagnetic Hypersensitivity Syndrome
- Electromagnetic Sensitivity
- Electrosensitivity
- Electrosupersensitivity
- * Screen Dermatitis
- * "Terminal" Dermatitis
- * Video Operator's Distress Syndrome (VODS)

The term *electrical sensitivity* seems to be generally understood and acceptable for United States and foreign communications. *Electrical sensitivity* also suits the term *chemical sensitivity*, another part of the environmental illness picture.

* Terms relating to electrical sensitivity symptoms specific to computer users.

What is Environmental Illness?

Environmental illness, also known as EI, means an illness occurring because of exposure to environmental toxins. Environmental illness is chemical sensitivity, electrical sensitivity, the Sick Building Syndrome, and now probably the Gulf War Syndrome.

Veterans from the Persian Gulf War, who are collectively ill from symptoms such as fatigue, headaches, nausea, breathing and memory problems, have called their illness Gulf War Syndrome. This syndrome is currently suspected of being related to toxic chemical exposure and, if so, makes the illness another form of chemical sensitivity.⁷⁹

Multiple chemical sensitivity (MCS) occurs when someone is chemically poisoned by toxins in the environment and subsequently becomes ill, especially when exposed to ordinary chemicals in our modern world.⁶⁶ Once overexposed, they can no longer tolerate such chemicals as household detergents, garden pesticides, perfumes, natural gas emissions from gas stoves, etc. Molds, dust, smoke, and pollen may also increase their symptoms.⁹⁴

Dealing with chemical sensitivity means adjusting your environment to minimize irritants, indoors and out. Moving to an area with cleaner air, low pollen levels, and no pesticide spraying is ideal for controlling your outdoor environment to help your health.

Cleaning your indoor environment of chemicals that could be adding to your chemical load of exposures is often more difficult. Organizations such as The National Center for Environmental Health Strategies can suggest suitable alternative products to reduce chemical exposures. (See Information Resources, page 72.)

However, the most difficult part of having an environmental illness is not being able to control your environment beyond your home. When you leave home for errands or work, you are exposed to various everyday sorts of things that previously you would not have noticed, but now make the symptoms worse. The most chemically ill feel they cannot safely leave their home due to chemicals they may encounter everywhere else.

Chemically sensitive patients sometimes also become electrically sensitive. Their

illness symptoms intensify near power lines and electrical appliances, causing some people to become hermits in order to avoid the twentieth century's modern conveniences.

What is Electrical Sensitivity?

Electrical sensitivity (ES) is a form of environmental illness — a chronic illness triggered by exposure to electromagnetic fields. (See What Are Electromagnetic Fields (EMFs)?, page 61.)

Being electrically sensitive means having an illness that *noticeably* reacts or intensifies near electrical appliances, power lines, and/or other electromagnetic field (EMF) sources. ES includes *recurring* feelings of stress or illness when near these EMF sources, even if the person affected has no illness apparent when not exposed to EMFs. Any noticeable, recurring ill health that is triggered by an electromagnetic field, and that diminishes or disappears away from the EMF source, constitutes a case of electrical sensitivity.

Just as the chemically sensitive can become very sensitive to small amounts of chemicals, ES patients can become *hypersensitive* to EMF levels that normally would not be noticeable to the general public. However, the dividing line between "safe" and unsafe levels of EMF exposure is not presently clear for the public at large. (See The EMF Cancer Issue, page 62.)^{2, 40, 41, 53, 69}

People sometimes become ill from an EMF source, such as having an electrical appliance (i.e., clock, cassette player, etc.) too close to their bed. Published accounts mention symptoms such as insomnia, nausea, headache, or other noticeable health problems from prolonged exposure to these EMFs.^{39, 65}

In one United States case, a multiple chemical sensitivity patient developed nausea after meals in addition to his usual MCS symptoms. He thought about what he was doing differently and began to suspect that maybe his new health problem had something to do with his new VCR (video cassette recorder). He talked to friends about EMFs. One friend suggested he buy a gaussmeter to measure EMFs in his house. He did and subsequently measured EMF exposure in his house, including his appliances. A new

cassette player on his bed's headboard gave a high reading, even when it was shut off. He moved the cassette player away from his bed. His nausea gradually decreased from that point on.⁶⁵

Other similar instances were reported in a United States newsletter that interviewed German EMF testing technician, Wolfgang Maes. Three cases of people with problems sleeping were noted, all corrected by removing everything electrical from the bedroom. In addition, a child who had stomach pains, nervousness, insomnia, and headaches was able to sleep without headaches after the EMF wall wiring problems of his bedroom were solved. One day after the EMF was reduced, all of his health problems began to improve. A fifth case mentioned was a two-year-old with headaches and severe muscle cramps all over. She slept with a radio alarm clock on under her pillow to stay warm. When the parents took away the radio, the child gradually improved.³⁹

In the cases cited, moving the offending EMF source(s) or correcting wall wiring problems produced a return to health or substantial improvement in health.

Were these people electrically sensitive? Although their health problems were not permanent, for a time they seemed to be electrically sensitive to a specific EMF source or location. If the EMF source had not been found and their EMF exposure reduced, they may have developed a more severe and permanent ES.

There are degrees of ES just as there are degrees of chemical sensitivity. Allergies are a mild form of chemical sensitivity; Sick Building Syndrome, a more severe form. Multiple chemical sensitivity is chemical sensitivity's most severe and chronic form.⁷⁸ The one-time, reversible form of ES from the cases noted above seem to be representative of a mild form of ES.

With chronic, long-term ES, the person becomes sensitive to an initiating EMF frequency, intensity, or duration. Later, the illness is further triggered when the person is exposed to other EMF sources also. This environmental illness process is called a spreading phenomenon.⁹⁴ A one-time ES experience should be considered a warning sign of possible chronic ES susceptibility.¹⁴

Electrical sensitivity has the great potential for being a missing link that uncovers explanations for many noticeable, recurring health problems people currently have no medical answers for and no long-term relief.

ES Statistics

How many people in the United States are estimated to be electrically sensitive (ES)?

No formal statistics are currently available.

As an estimate, we could assume that the ratio of ES patients to the general population is the same for both Sweden and the United States. In 1994, Sweden's Association for the Electrically and VDT Injured had about 1800 members. Further, Sweden's group estimated that in 1993 at least 10,000 Swedish citizens were ES.¹⁴ Using Sweden's estimated range of ES people of between 1,800 - 10,000, the United States would have between 52,043 - 289,130.*

If mild forms of ES and other EMF-related illnesses are included, these figures would be significantly greater.

What percentage of chemically sensitive patients become ES?

Only an estimate is possible at this time.

The Environmental Health Center in Dallas has treated over 20,000 chemically sensitive patients at various stages of the illness. Also, they have treated over 500 ES patients.^{94, 101} Some people had both illnesses and others only had one. If we assume that *all* of the ES patients were also chemical sensitivity patients, then as many as 2.5% of the chemically sensitive patients were ES too.

If only the most severe MCS patients were counted, the percentage of ES within that group would probably be more.

What Are the Symptoms of Electrical Sensitivity?

In general, environmental illnesses can produce nearly any symptom, depending

* 1992 Sweden population (estimate) = 8,602,000
1990 United States population (estimate) = 248,709,873

upon the type of irritating exposure and the uniqueness of the individual exposed.⁹⁴ One exposure, whether chemical or electrical, can create symptoms of fatigue in one person and hyperactivity in another person. Symptoms of electrical sensitivity (ES) may manifest as any of a wide variety of health problems. However, symptoms are mainly skin-related or neurological.^{12, 18} ES skin reactions tend to be a mild form of ES initially, but can intensify to intense burning levels with prolonged EMF exposure. Advanced ES skin reactions may be accompanied by neurological and other symptoms as well.

Common ES symptoms when exposed to EMF sources are headache, nausea, fatigue, dizziness, tingling or prickling sensation on the skin, burning skin or eyes, difficulty concentrating, memory loss, muscle or joint pain, and heart rate fluctuations. Less common, but more severe reactions include paralysis, seizures, and unconsciousness.

Other symptoms may also be present; those listed prior appear to be representative of ES patients worldwide.^{4, 14, 53, 69, 102} Several ES symptoms may occur together or only one. Because electromagnetic fields are almost everywhere in our modern society, even one chronic symptom can lead to restricted work/social opportunities and disability.

In the United States, a medical study of 100 ES patients at the Environmental Health Center, Dallas, Texas, showed many EMF reactions under controlled conditions: neurological, muscle/skeletal, heart, eye, ear, skin, tooth, respiratory, and gastrointestinal. The primary symptoms of these ES patients during the study was neurological — tingling, headache, sleepiness, dizziness, and unconsciousness.¹⁰²

The Association for the Electrically and VDT Injured in Stockholm, Sweden list common ES symptoms for them as skin — burning, pricking, tingling; eyes — burning, dryness; ear, nose, throat — swollen membranes, dryness of nose and throat; neurological — memory problems, dizziness, lack of concentration, headache; heart — fluctuating heartbeat; tooth — pain; muscles/joints — pain; gastrointestinal — nausea.¹⁴

Nineteen ES patients who were medically evaluated in England described these reactions to EMFs: unconsciousness, fatigue, headaches, colitis (colon inflammation), neck pain, hyperactivity, dizziness, nausea, diarrhea, and extreme weakness.⁴

ES symptoms may turn off and on with the EMF exposure, there may be a delayed reaction, or a prolonged effect lasting hours or days after the exposure ceases.

The Other ES Symptom

While doing a radio show, the author was asked by a sincere talk show host whether it was possible that a person could affect electrical appliances, instead of the EMFs affecting the patient. The host explained that she knew someone who insisted that they could jumble computer disk information and distort computer screen displays just by being near them.

In England, one medical question posed to ES patients is whether appliances work all right when used by the patient.^{9, 10} Apparently, some ES patients and otherwise normal folks can emit EMF signals that interfere with the electricity of appliances. A person trying to use a washing machine may find the equipment shuts off immediately after it turns on when they try to use it, while working for other operators. Television sets and remote controls are also susceptible to human EMF interference.¹⁰

Power line radiation is known to affect television and radio reception, and distort computer screen displays. In particular, magnetic fields from electrical power lines are known to wipe out computer disk information and affect the computer's screen display.²⁹ EMFs emitted by some people may do the same thing. (See also Metal Sensitivity, page 42.)

A World Health Organization publication reported that the human body emits EMFs up to 300 gigahertz (300,000,000,000 Hz), but the strength is very low (about .003 watts per square meter).¹³⁶

The Psychology of ES

When a person first suspects that EMFs are producing their illness symptoms, voicing this concern often leads to predictable results. The new ES patient may be

harshly condemned by medical doctors, scientists, their electrical utility company, their employer, friends and relatives for considering such a "crazy" idea as electricity hurting them. Their job, friendships, and marriage all become severely stressed, both by the limitations of the ES patient and by the mental trauma of trying to cope, with little emotional support.

When a primary caregiver is incapacitated, the whole family feels threatened because part of their support system is missing. Incapacity for the ES patient may mean inability to drive, cook, shop, remain in the workplace, or even use the phone due to symptoms experienced by the EMF exposures involved. If an ES person cannot stand the EMFs of a computer or television set operating in the house, the spouse and children may not well tolerate changes they need to make in their computer or television usage.

The ES patient may reduce their demands on others in order to maintain family harmony, but at the cost of their own diminished health.

Because traditional medical doctors generally know little or nothing about environmental illness, those patients with ES may hear words like psychosomatic, hypochondriac, or psychotic to "explain" their symptoms. The suggestion of seeing a psychologist or psychiatrist may be presented as a way to work through their mentally-based illness. Electrical sensitivity *is not* a mentally-based illness. (See *The Causes of Electrical Sensitivity*, page 20.)

If chemical sensitivity is present with ES, it is possible that brain function has been impaired due to toxic chemical exposure (neurotoxins). For example, organophosphate pesticides, known neurotoxins, reduce enzyme function and produce nervous system damage — MCS patients most severely affected are among those so exposed.⁹⁴ Petroleum-based products (plastics, solvents, pesticides, paints, etc.) are chemicals having neurological symptom reactions for many chemically sensitive patients.^{86, 88} Toxic chemical exposure can damage the brain and lead to subsequent neurological symptoms upon future exposures to chemicals or EMFs. Radiation exposure from EMFs may also lead to nerve and/or brain damage, if the exposure is severe enough. So, in some cases,

brain and/or nerve function may be impaired initially due to a toxic environmental source. Then, brain and/or nerve function can be further impaired by subsequent triggering exposures to offending chemicals or EMFs. Above average EMF exposure has been shown to be related to increased depression and higher suicide rates.¹³⁵

Beyond whatever nervous system damage that may be present, several typical emotional states occur when ES patients assess their predicament:

- Anger — at doubtful family members or the employer, if work-related cause.
- Depression — can be induced by EMF exposure or by general exasperation in their situation.
- Frustration — with their condition.
- Hopelessness — when no one understands or they cannot find medical help.
- Restlessness — regarding their EMF-imposed limitations.
- Searching — that unending quest for answers, products, or therapy to help them feel better and return to a normal life.

The stress of environmental illnesses is compounded by the emotional stresses of often inadequate/inappropriate medical care, the severe social and functional limitations often imposed, and lack of understanding and emotional support from family and society in general. Family assistance and acceptance are very necessary for ES patients as well as for other environmental illness patients due to the often traumatic and life-changing events involved.

The Causes of Electrical Sensitivity

Current available information does not indicate that microbes — bacteria, virus, fungus, etc., play any initiating role in ES. Instead it is believed to be an environmental illness, caused by environmental toxins — primarily electromagnetic fields.

Important answers that need to be defined include those to the following questions:

- What types of people are getting electrical sensitivity (ES)?
- What was the initial incitant?
- Were there any pre-existing health conditions present that may have

predisposed the person to become ES?

So far, available information points to three basic types of people most often getting ES:

① multiple chemical sensitivity (MCS) patients, ② computer users, ③ people exposed to high levels of EMFs for prolonged periods of time.

Group ① Multiple Chemical Sensitivity Patients

MCS is a severe and debilitating form of chemical sensitivity. After becoming ill from chemical exposure, some MCS patients begin to experience further illness from EMF exposures.⁸ An English medical article in Clinical Ecology notes that there seems to be a link between ES onset and exposure to certain chemicals — pesticides, in particular, are mentioned.¹⁰ Chemical sensitivity often precedes or accompanies ES.^{23, 102, 109} A general trend, based on anecdotal accounts, seems to be that the more chemically sensitive a person is, the more apt they are to be or become ES too.

Sweden's FEB group (The Association for the Electrically and VDT Injured) in Stockholm, relates that they found ES can sometimes lead to chemical sensitivity. So, one environmental illness may predispose the other.

Why are some people with chemical sensitivity having electrical sensitivity problems or the other way around?

Chemical overexposure which causes chemical sensitivity can create nervous system overload/damage from neurotoxic chemicals.^{86, 106} Therefore, subsequent exposures to similar chemicals cannot be adequately tolerated. Also, fat-soluble chemicals can store in body fat and organs, remaining in the body to chronically sensitize the chemically sensitive patient to those chemicals already overexposed. So, for the chemically sensitive patient, two factors may be at work to lead to ES: nervous system (neurological) damage and toxic chemicals stored in the body.

To understand how anyone could become sensitive to electrical fields, first it is important to know that the human body is electromagnetic.^{9, 33} Modern hospital equipment monitors the brain's electricity by electroencephalogram (EEG) and the heart's

electricity by electrocardiogram (EKG). The brain, heart, and nervous system of the body are all highly electrical. In addition, all living cells have electrical properties.

Many of the ES symptoms are manifestations of nervous system dysfunction when in the presence of EMF sources. Neurological damage from chemical overexposure may, therefore, limit a chemically sensitive person's ability to deal with EMFs due to the electrical nature of the nervous system. Induced electric currents in the body from outside EMF sources have been shown to affect the body's nervous system.¹⁰² According to a World Health Organization publication, EMF frequencies below 100 kilohertz (100,000 Hz) are most interactive with the nervous system, while higher frequencies are more apt to produce heat effects.¹³⁶ EMFs may be neurotoxic. Essentially, low-frequency, low level EMFs are able to interfere with the electricity of life processes. For the ES patient, their symptoms are the clear proof of this interference.

Secondly, chemicals are each electromagnetically unique. Organic chemistry experiments use spectroscopy to identify chemicals by their absorption properties in the x-ray, microwave, infrared, ultraviolet, and visible light regions of the electromagnetic spectrum. These experiments are also called spectrum analysis.^{55, 125}

Some drugs make people more sensitive to sunlight because the drugs have a high absorption rate in the visible light/ultraviolet part of the electromagnetic spectrum. The same could hold for other chemicals that have high absorption rates in other (lower frequency) parts of the spectrum. (See What Are Electromagnetic Fields (EMFs)?, page 61.)

The author's theory is that chemicals which have a high absorption rate in the lower end of the electromagnetic spectrum may induce a sensitivity to electromagnetic exposures that represent the same frequencies the specific sensitizing chemicals respond to. Toxic chemicals stored in the body could intensify the ES reaction because the stored chemicals are strongly reacting to the EMFs, and further sensitizing the patient to that EMF frequency. This could explain the frequency-specific nature of ES, from EMF interaction with stored toxic chemicals to EMF interaction with body chemistry.

A final possibility as to why chemical sensitivity can lead to ES is found in an experiment where a rabbit was injected with poison.⁶¹ The initial result was a monitored decrease in the rabbit's liver and muscle electricity. Higher electromagnetic energy sources are known to affect lower electromagnetic energy sources. If a person's body electricity was reduced due to chemical toxin exposure, their sensitivity to external electrical fields could be increased due to their own lowered electrical field.

A vital question that has not been scientifically answered yet is "What specific chemical exposures most lead to ES?". Currently, the most neurotoxic chemicals are the more likely ES initiators, when ES has a chemical cause.

Why are some electrically sensitive becoming chemically sensitive? Possibly sensitizing oneself to EMFs that represent certain chemicals could make contact with those chemicals produce symptoms as well.

Also, nerve damage from EMFs may predispose some chemical sensitivities. Another idea is that chemical exposure was an unknown co-factor in the initial EMF sensitizing process, such as working with a computer — which has flame retardant chemicals, phenol, plastics, etc.

Group ● - Computer Users

Computer users as a group are an unhealthy people. Two of their major health complaints are eye problems and carpal tunnel syndrome. According to the American Optometric Association (AOA), eye strain, burning eyes, and blurred vision are among the most common eye problems reported by computer users. The AOA also cites frequent reports of headaches and neck aches among computer users.²⁷ Interestingly, burning eyes, headaches, and muscle/joint pain are also ES symptoms related to EMF exposure.

Computer monitors have been measured for EMF emissions and the following types reported: x-rays, ultraviolet, microwaves, visible light, infrared, radio waves, and power line radiation.^{2, 40, 53, 68, 69} (See Computer Radiation Standards, page 77.)

Is carpal tunnel syndrome related to computer radiation exposure? Carpal tunnel

syndrome (CTS) has a history of occurrence in occupations which require repetitive motion, such as assembly line work and chair caning. Typing at a computer requires repetitive motion too, so certainly CTS could be expected to some extent. However, CTS is now an epidemic, particularly among computer users.^{93, 118} One reason may involve the use of electronic monitoring at many large employers. This type of electronic surveillance counts key strokes, the time used for lunch and breaks, and when the person arrives and leaves. Supervisors can evaluate typing speed and accuracy by computer, while the clerical employee is essentially chained to their computer monitor.

The 1987 book VDT Syndrome - The Physical and Mental Trauma of Computer Work written by the National Association of Working Women, Cleveland, Ohio examined 34 cases of computer-related illness. Most had carpal tunnel syndrome, 4 cases were skin rash, 5 ganglion cysts, and a 34-year-old with cataracts. They also noted that significant numbers of workers were reporting nausea, dizziness, or constant exhaustion related to their computer work.⁹³

One clue that computer radiation may be a co-factor in the CTS epidemic is found in a book regarding EMFs published by the World Health Organization, Geneva, Switzerland.¹³⁶ Relating to frequencies in the 300 Hertz to 300 gigahertz (300 - 300,000,000,000 Hz) range, it states that energy (EMF) absorption increases at the neck, legs, and wrists. The reason absorption increases at these points is because they are areas of smaller cross sections in the body. Absorption rates in the wrists and ankles can exceed the overall body EMF absorption rate by as much as 300 times depending on the EMF frequency. No specific frequencies were given relating to these high energy depositions. However, the two primary frequency ranges monitored for computer monitor EMF standards are at 5 Hertz - 2 kilohertz (5 - 2,000 Hz) and 2 kilohertz - 400 kilohertz (2,000 - 400,000 Hz).¹²¹ Therefore, both of these ranges are within the World Health Organization's frequencies under discussion above.

The two primary EMF frequencies of computer monitors are at 60 Hertz (U.S.) and at about 20 kilohertz (20,000 Hz).¹²³ However, harmonics spread the range of