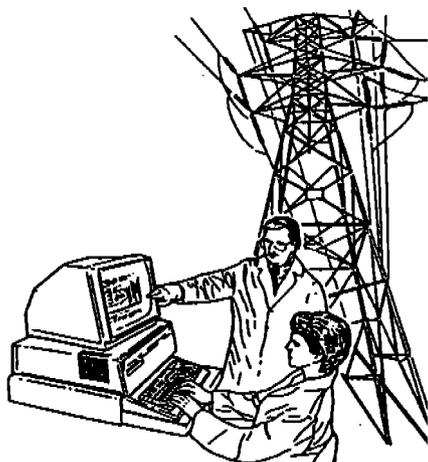




Electromagnetic Interference of Video Display Units by Extremely Low Frequency Magnetic Fields

Just the Facts

24-001-0994



Much attention has been given in recent years to the presence of extremely low frequency (ELF) magnetic fields (H) produced by video display units (VDUs). Various adverse health effects have been suggested as being associated with these low-level fields, but none have been confirmed by scientific research (reference 2). Other sources of ELF H fields in most office environments are fluorescent lights, copiers, air conditioners, electric wiring, and electric transformers. These other sources can produce ELF H of greater intensity than the MU. However, in most instances, the ELF H intensity is still much lower than existing exposure guidelines (reference 3).

Conversely, we know electronic devices are susceptible to electromagnetic interference (EMI) from ELF H at intensities far below the guidelines for human exposure. Sometimes, this interference will affect the normal functioning of the device. In the case of VDUs, ELF H can cause the display image to waver or bounce. Although this will not damage the VDU, the operator will undoubtedly notice the effect and try to determine what is causing it. Typically, the user will report that the VDU is broken and request repairs. When the VDU is serviced and no defect is found, it is returned to the user where the effect returns. Eventually, the source of the problem is determined to be the ELF H from some source near the MU.

How will I know I have an EMI problem?

The detection of waver or bounce on the VDU screen is subjective, dependent upon individual sensitivity. Also, the

threshold H level for EMI will vary with VDU type and design. A monochromatic display, for example, could be noticeably affected by ELF H levels as low as 10 mG. This level is 500 times below the IRPA guidelines for human exposure.

Are there health effects associated with exposure to ELF magnetic fields and how should I respond?

The appropriate response to an EMI problem is to determine the ELF H levels and the source responsible for the interference. The simplest solution will normally involve relocating the VDU to an area with reduced ELF H levels. The VDU operator will naturally pose questions about possible health effects associated with exposure to these elevated field levels. The individual directing the change should clearly inform those with concerns that the change was necessary to prevent EMI, not to mitigate human exposure to the fields. There is no substantiated health risk associated with typical ELF H levels in office environments.

What should I do if I have an EMI problem?

In most situations, judicious arrangement of furnishings and equipment in the office will prevent EMI with VDUs. Since the strength of the ELF H will reduce rapidly with distance from the source, the VDU should be moved to a location far enough from the source to prevent the effect. In the rare instance when this option is impossible or impractical, another option is to reduce ELF H coming from the source. Exercising this option must be balanced against factors which could affect the

- ◆ Radiation Protection Officers
- ◆ ELF Magnetic Field
- Video Display Unit
- ◆ EMI

Radiofrequency/Ultrasound Program
 U.S. Army Center for Health Promotion and Preventive Medicine
 Aberdeen Proving Ground, MD 2101 0-5422
 DSN 584-3353 or Commercial 41 0-671-3353

source that is being modified. For example, rerouting electrical wires could create an electrical safety hazard. Shielding the VDU with a high permeability material (such as mumetal) is generally not cost effective and should be considered only as a last resort. Shielding the EMI source with high permeability material is equally inappropriate under most circumstances.

Should manufacturers design all VDUs to prevent EMI?

Some manufacturers of VDUs have designed their systems to work in environments where elevated levels of ELF H are present. But, the cost to make all VDUs impervious to EMI is prohibitively expensive in a competitive market. Many manufacturers of other electronic products will disclaim responsibility for EMI problems. These examples indicate the relative ease with which most products are susceptible to EMI.

Summary.

The ELF H produced by all electrical devices will sometimes interfere with the operation of VDUs. When this occurs, moving the VDU away from the source will usually eliminate the effect. The presence of ELF H in the work environment does not imply that a health hazard exists. The field levels in most environments are well below suggested guidelines for human exposure limits. Based on current knowledge, personnel need not be concerned for their health when a VDU or other similar electronic device experiences EMI from ELF H.

References.

1. Institute of Electrical and Electronics Engineers, -IEEE C95.1-1991, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," 27 April 1992, New York, 1992.
2. International Non-ionizing Radiation Committee of the International Radiation Protection Association (IRPA), "Interim Guidelines on Limits of Exposure to 50/60 Hz Electric and Magnetic Fields," Health Physics, Vol 58, No. 1 (January), p p 113-122, 1990.
3. Baishiki, RS. and Deno, D.W., "Interference From 60 Hz Electric and Magnetic Fields on Personal Computers," IEEE Transactions on Power Delivery, Vol PWRD-2, No. 2, pp 558-563, April 1987.
4. IRPA Guidelines on Protection Against Non-ionizing Radiation; ed. AS. Duchene, J.R.A. Lakey, and M.H. Repacholl. Highstown, NJ: McGraw Hill, 1992.