



## **EMFacts case histories that indicate prolonged exposure to environmental level powerline frequency electromagnetic fields can impair immune system function.**

### **1) The Bed head: beware of what is on the other side of the wall.**

In June of 1994 a 49 year old female purchased an older home in Hobart, Tasmania. Soon after moving in she noted a marked difficulty in sleeping and reported that she felt "stimulated" and could not "turn off her mind" and relax at night. During the day she felt a distinct lack of energy. At about the same time she suffered ongoing colds and flu symptoms and a severe case of bronchitis. Ongoing self-medical treatment had no effect.

In December 1994 an electromagnetic survey of her home found very low fields throughout the home (less than 1 mG on average) but that her bed head was exactly opposite the motor and electrical circuitry of the refrigerator on the other side of the wall, thus giving nighttime (low power) magnetic fields of **9 to 11 mG** on the pillow. **The close proximity to the electric motor of the refrigerator would have additionally exposed the person to power supply transients** (brief intense pulses of energy) as the motor switched on and off at night.

Repetitious transients and surges commonly occur on power lines, but the more influencing transients are created by factors in the home and office. They occur whenever lights or other electrical devices turn on or off, such as refrigerator motors or compressors. Transients can be described as packing a big burst of electrical energy into a short period of time and can vary in frequency up to the hundreds of kilohertz, if not the low megahertz range.

To quote Allen H. Frey, author of *On the nature of electromagnetic field interactions with biological systems*:

*"In their statistical study, it was assumed that the active agent in power line biological effects is the 60Hz sinusoidal wave. But there is substantial data and biological theory to indicate that the primary active agent would be the transients that are found on power lines in varying forms to varying degrees in various places (Frey, 1994)."* [From a press statement discussing the findings of the National Cancer Institute's Linet Study]

Within 6 weeks of moving the bed away from the wall, her previous sleep pattern returned to normal and her susceptibility to "colds & flu" disappeared. Her health has remained fine up to the present time (Jan 23, 1999).

### **2) Electric blanket use and chronic fatigue.**

After moving with her family to Melbourne from Sydney in December of 1994, the 16 year old daughter came down with ongoing cold and flu symptoms and an overall lack of vitality for about 18 months, beginning about 16 months after moving to Melbourne. Symptoms included sore throat, blocked nose and cough, resulting in extensive time away from school. Her mother remarked that

she seemed to catch "every cold and flu bug that was about" and was concerned that her daughter's blood tests found very low iron levels.

Her doctor's recommended treatment consisted mainly of prescribing antibiotics, which had little effect. The daughter on several occasions, mentioned to her mother that she felt that "the house was making her sick" but nothing was apparent. During a discussion in early December of 1997, the mother mentioned that her daughter was always sleeping with her electric blanket energised all night. A subsequent EMF home survey in December of 1997 found the following:

Beginning in about July 1995 the daughter started using an electric blanket every night on the no. 2 or 3 setting, due to an unusually cold Melbourne winter. She had previously used the electric blanket only occasionally while living in Sydney. The EMF field survey of her home found very low fields throughout, however the daughter had a prolonged nighttime magnetic field exposure of **12 to 14 mG** with the electric blanket left on the #2 or 3 setting during sleep. Her symptoms started about May 1995, about 9 months after starting to use the electric blanket nightly.

On Dec. 12, 1997 the electric blanket was removed by her mother against the wishes of the daughter, who felt that she "needed the heat in order to sleep". According to the mother, her daughter's health greatly improved beginning about 4 weeks later the electric blanket was removed. On May 1998 the mother reported that her daughter's health and energy levels now appeared to be perfectly normal. However further blood tests taken at this time found that S Ferritin levels were only slightly improved. Considering that the daughter's health had greatly improved, without a corresponding significant increase in iron levels, suggests that the low iron levels may possibly be a symptom and not a cause of the daughter's health problem. Her mother reported that ceasing the electric blanket use at night was the turning point as no other factors were changed.

**On December 14, 1998 a further blood test of the daughter still found very low iron levels of S Ferritin of 12 ng/mL. ( 20 to 300 ng/mL)** but she is still enjoying apparent good health with no recurrence of the previous symptoms. Previous blood tests done in Sydney, where no iron deficiency was reported by the doctor, are unfortunately lost so previous blood iron levels cannot be determined.

Two possible factors are apparent in this case:

**A)** Considering that the daughter felt that she needed the heat from the electric blanket in order to sleep, it may be possible that heat stress was a contributing factor.

**B)** The magnetic field levels that she was exposed to from the energised electric blanket for a prolonged time nightly are clearly implicated with immune system dysfunction.

In relation to the girl's low iron levels, if electromagnetic fields are at all involved, it is likely to be through their affecting the activity of an enzyme pathway involved in the process. There is now evidence that both copper and iron deficiency are associated with environmental EMF exposure. According to a paper tabled in the European Parliament:

*"... medical monitoring of a population exposed to electromagnetic fields from high tension lines such as that at Coutiches (Northern France) revealed another important finding: the lack of certain elements such as iron and copper in the blood composition, something which was observed many times in farm animals living near high tension lines. **There is every indication therefore at this stage that the electromagnetic fields due to transmission and distribution of electricity disturb the iron and copper metabolism**" [Paul Lannoye, Rapporteur for the Environment Committee of the European Parliament on harmful effects of non-ionizing radiation, DOC-ENPR \236913, PE 208.520].*

**This raises the possibility that low blood iron levels in CFS patients may be a "marker" for possible electromagnetic field involvement.**

### **3) Eczema and excessive EMF exposure in the home**

On December 10, 1997 a home survey conducted for a cancer patient found extremely high magnetic fields throughout a home in Broadway Ave. Elwood, Melbourne. The family had lived there for 24 years. Spot magnetic field measurements of the order of **10 mG** were measured in the upstairs bedrooms, **72 mG** on the metal water pipe coming into the house and an overall average of **4.6 mG** throughout the home. Corrective action involved isolating the metal water pipe on the house side of the water meter. Measurements taken after this work was done found magnetic fields under 2 mG. Average home measurements reduced from 4.6 mG to 1.3 mG. It is important to note that due to close proximity to street powerlines, spot measurements will vary according to time of day, especially as the powerline seemed to have an unbalanced load on the line, thus emitting excessive magnetic fields.

A phone enquiry on December 18, 1998 found that the 22 year old son, who had lived at the house all his life, reported a significant improvement in his eczema, which had grown progressively worse since moving into the upstairs bedroom five years earlier. The main problem with his eczema was extreme itching at night, requiring the wearing of woollen gloves to protect his skin. He reported that virtually from the day the fields were reduced by isolating the water pipes his night itching was greatly reduced. He now compares his current condition to what it was five years earlier before he moved into the upstairs bedroom. His doctor mentioned to him that his skin type was not the type usually associated with eczema.

When the home was re-surveyed for magnetic field levels on December 10, 1998, at about 2:30 pm, the fields from the street power line was excessive, with **3.5 mG** on his bed and **5.5 mG** on his parents' bed. So in spite of his improvement, he still has excessive exposures at night. He also works at night with electronic sound equipment.

It is possible that if he moved to another residence with low magnetic fields, his eczema would further improve. **He reported that he is certain that the reduction in the fields ( approximately from 10 mG to 3.5 mG) in his bedroom was directly related to the improvement in his condition.** His parents are demolishing the house, due to foundation subsidence, and will build a new one, with the bedrooms at the rear to minimise the magnetic fields. Enquiries are also being made to investigate ways the power supplier could balance the load on the powerlines in the street to reduce the powerline fields.

### **4) CFS and combined workplace / home exposures.**

A referred case in April 1, 1998 was of a 28 year old beautician who had on-going treatment for CFS symptoms with no success. Her main problem was extreme fatigue. Being a beautician, chemical exposure at work was a suspicion, and a survey of both her home and workplace was carried out. Workplace room magnetic field exposures were very low, less than 0.5 mG. However the Venes Halogen Lamp on her desk, where she spent about 3 hours daily, was emitting **1,300+ mG** directly by the lamp and **29.8 mG** at her usual sitting position. This was also the case when the lamp was turned off at its switch but still turned on at the power point. Another fluorescent lamp, an Austrabeam Light at the adjacent desk, was emitting **13 mG** at the sitting position and nothing when switched off at its switch. The difference between the two lamps was the way the individual lamps were wired. An upstairs fluorescent lamp was emitting **2.5 mG** at user position. The other equipment did not appear to be a problem at user position, with exposures generally under 2 mG. Overall, her workplace exposures were significant, coming mostly from her desk lamp.

As a side issue, it was noted that the beauty parlour offered a Solarium to its customers (not used by CFS patient) which would expose any user to about 160 mG as well as a hazardous frequency of Ultraviolet light.

Recent research by the American Academy of Dermatology and published in the September 1998 issue of the U.S. *Proceedings of the National Academy of Sciences*, found that the frequency of UV light used in tanning beds, causes skin photo aging which can lead to wrinkles, age spots and skin cancer. The researchers discovered that when human skin is exposed to UVA light, it creates the oxygen radicals that are responsible for premature photo aging of skin, as well as damaging DNA, **suppressing the immune system** and causing some respiratory problems.

At the patient's home I found very high fields in the house due to high electrical currents on the metal water pipes, giving a magnetic field of 263 mG on the water pipe coming into the home. At time of measurement, her bedroom levels were low, at 1.2 mG, but the main living area was reading over **17 mG**. The average home level was about **7.8 mG** which was far in excess of 0.5 to 0.7 mG, which may be considered as an "average" home level from previous surveys in Melbourne .

Her accumulated weekly exposures from both work and home were significant. She was advised that these could be greatly reduced by replacing the desk lamp at work, having an electrician check out the home wiring and having a plumber place a plastic isolator on the copper water pipes at the water meter. The high fields are a direct result of the electric current on the water pipes, which are acting as a net current path back to the powerpole step down transformer. (Net currents, being unbalanced, give off high magnetic fields)

As a result of this information she has moved to another home and at work, unplugs her desk lamp when not actually used. The exposures in the new home are not yet known, but as the average home magnetic field exposure from previous surveys (and other studies) is between 0.5 to 0.7 mG, she is most likely living in significantly reduced magnetic fields at her new home. She reported on May 7, 1998 that since making these changes her condition has significantly improved. She also remarked that there was almost an instant improvement felt after moving to another home.

On December 6th 1998 a follow up phone enquiry of this case found that she still suffered from fatigue from time to time but there was a significant improvement since making the recommended changes. **She remarked that her previous home and work exposure seemed to apparently be a contributing factor but she didn't think it was the primary cause of her problem.** This would lend support to the hypothesis that EMFs may be a co-factor to consider in effective treatment for CFS symptoms .

## 5) Workplace "stress' and excessive magnetic field exposure

In May of 1999 I was contacted by a 25 year old male who was working as a Marketing Coordinator in a Credit Union in Adelaide, South Australia. Prior to his starting at this office he was very athletic and "easy going" in his words. He had been working in the same office for 18 months and started having health problems after about 4 to 5 months working there. He had glandular fever sometime prior to the onset of symptoms, which were:

- pins & needles/burning feeling on skin.
- Mind racing
- tight feeling in chest
- Deterioration in eyesight.
- Low energy.
- Intense feeling of stress increasing during the working week.

- Blood tests found low iron

An EMF survey conducted at his work place on May 6, 1999, found that his office averaged 2 mG but where he worked the level was 6.8 to 7 mG due to air conditioning equipment on the roof directly above his desk. He worked at the desk for 3 to 4 hours daily 5 days per week.

That same week he moved into a temporary office and found a great improvement in health starting several weeks after moving. Some months later he was moved downstairs to a permanent office and within a few days started having the same previous health problems. A subsequent survey of the temporary office found levels to be under 2 mG (where he felt fine) but in his new office levels were 5 + mG. He left his place of employment to work from home and felt much better. However he still has occasional relapses and feels like it is "hitting the wall" when the relapses occur.

**It would seem that his workplace magnetic field exposure was not the cause of his condition,** which may have been connected to his earlier bout of glandular fever. However it is possible that his weakened state with a compromised immune system may have made him especially sensitive to magnetic fields which normally would have had no effect.

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