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The English version is a summary of the more extensive situation report bulletin in Finnish.

## Research Conducted from Different Perspectives Around the World



**Situation Report Bulletin 1 / 2010 - published 10 June 2010**

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Tampere University of Technology. Department of Energy and Process Engineering. Situation Report Bulletin  
ISSN 1799-4608

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No. 01

### **Editorial**

As I started to compile this situation report, I thought that I might not even find enough new studies or other interesting publications. I already knew that neither the International



Commission on Non-Ionizing Radiation Protection (ICNIRP) nor the European Union has published anything new.

My doubts turned out to be unfounded as I found several interesting publications. I start the report with an article that focuses on the potential link between extremely low-frequency electric fields and cancer. A number of studies have discussed the association of magnetic field exposure with cancer, so the subject seemed new and fresh. According to the researchers there is very little evidence for the assumption that electric fields could be associated with health risks. If you would like to read up on this topic in more detail, you should read the comment related to the article and the reply to it in *Bioelectromagnetics*.

The next few articles demonstrate how extensively this subject matter is being discussed and studied around the world. In Japan, the researchers have studied the association between power-frequency magnetic fields and childhood brain tumours. In Rome, research has been conducted on the morbidity experience in populations residentially exposed to 50 Hz magnetic fields. In the United States, the research has focused on environmental justice, and this study starts with the question whether minority or lower-income residents in a certain geographical area have disproportionately higher exposures to environmental toxins than those living elsewhere. The study was conducted in areas with 345 kV high-voltage electric power transmission lines. As to the Swiss population, research has been conducted on residence near power lines and mortality from neurodegenerative diseases.

In addition to the issue of electric fields and cancer, I also found an article that reviews the results of various other studies. It discusses the effects of extremely low-frequency magnetic field exposure on cognitive functions and reports the results of a statistical meta-analysis, with the outcome that there are hardly any effects to be observed.

The latter part of the report will include some interesting publications related to occupational exposure. In Great Britain, data has been collected on the population's occupational exposure to extremely low-frequency magnetic fields. According to the researchers, the average exposure is stronger at work than at home. An increased average exposure in their data was found amongst welders, printers and telephonists as well as amongst filing and other records assistants. Another article related to occupational exposure deals with workers at electric stations in Turkey as well as genotoxic risk.

The last two publications are part of my own research. The first one reports on an extensive survey conducted a few years ago. Based on an open question in the survey and using qualitative methods, the aim was to estimate the number of Finns experiencing electromagnetic hypersensitivity. According to this data, the number is quite low. My other publication is a follow-up on studies that examine occupational exposure to electric and magnetic fields. This particular study dealt with work tasks carried out at 110 kV substations in the Tampere region.

Hope you enjoy reading this summary in English!

Leena Korpinen,  
Editor-in-chief, Situation Report Bulletin  
Tampere University of Technology, Environmental Health and Safety

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The Finnish situation report bulletin includes summaries of the following publications, preceded by the editor-in-chief's comments.

No. 02

### ***Extremely Low-Frequency Electric Fields and Cancer: Assessing the Evidence***

Editor-in-chief's comment: This study is a review of the results of other studies. According to the researchers, there seems to be very little basis for the assumption that electric fields could be associated with health risks.

Source:

Kheifets L, Renew D, Sias G and Swanson J. Extremely low frequency electric fields and cancer: assessing the evidence. *Bioelectromagnetics* 2010;31:89-101

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No. 03

### ***Power-Frequency Magnetic Fields and Childhood Brain Tumours: A Case-Control Study in Japan***

Editor-in-chief's comment: It is an interesting discovery that the researchers found a positive association between high exposure (above 0.4  $\mu$ T) and the risk of brain tumours in Japanese children that could not be explained by other factors.

Source:

Saito T, Nitta H, Kubo O, Yamamoto S, Yamaguchi N, Akiba S, Honda Y, Hagihara J, Isaka K, Ojima T, Nakamura Y, Mizoue T, Ito S, Eboshida A, Yamazaki S, Sokejima S, Kurokawa Y and Kabuto M. Power-frequency magnetic fields and childhood brain tumors: a case-control study in Japan. *J Epidemiol* 2010;20(1):54-61

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No. 04

### ***Morbidity Experience in Populations Residentially Exposed to 50 Hz Magnetic Fields. Methodology and Preliminary Findings of a Cohort***



## **Study**

Editor-in-chief's comment: This study focused on population living in the vicinity of 60 kV electric distribution lines. Despite the small size of the data, the researchers found an increased risk for various diseases in the group studied.

Source:

Fazzo L, Tancioni V, Polichetti A, Iavarone I, Vanacore N, Papini P, Farchi S, Bruno C, Pasetto R, Borgia P, Comba P. Morbidity experience in populations residentially exposed to 50 Hz magnetic fields. Methodology and preliminary findings of a cohort study. *Int J Occup Environ Health* 2009;15:133-142

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No. 05

## ***Environmental Justice: A Contrary Finding for the Case of High-Voltage Electric Power Transmission Lines***

Editor-in-chief's comment: This US study shows that people living within 600 metres of high-voltage electric power transmission lines and thus more likely to be exposed to magnetic fields were more often white, of a higher income, more educated and home owners than those living further away, especially in urban areas.

Source:

Wartenberg D, Greenberg M R and Harris G. Environmental justice: a contrary finding for the case of high-voltage electric power transmission lines. *Journal of Exposure Science and Environmental Epidemiology* 2010;20:237-244

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No. 06

## ***Residence Near Power Lines and Mortality from Neurodegenerative Diseases: Longitudinal Study of the Swiss Population***

Editor-in-chief's comment: In Switzerland, the researchers found a slightly increased risk of Alzheimer's disease but not of Parkinson's disease, ALS or multiple sclerosis in people living within 50 metres of 220–380 kV power lines.



Source:

Huss A, Spoerri A, Egger M and Roosli M. Residence near power lines and mortality from neurodegenerative diseases: longitudinal study of the Swiss population. *Am J Epidemiol* 2009;169:167-175

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No. 07

### ***Effects of Extremely Low-Frequency Magnetic Field Exposure on Cognitive Functions: Results of a Meta-Analysis***

Editor-in-chief's comment: This study brings together the results of a total of nine studies on the effects of magnetic field exposure on cognitive functions. Little evidence of any effects was found.

Source:

Barth A, Ponocny I, Ponocny-Seliger E, Vana N and Winker R. Effects of extremely low-frequency magnetic field exposure on cognitive functions: results of a meta-analysis. *Bioelectromagnetics* 2001;31:173-179

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No. 08

### ***Survey of Electromagnetic Field Exposure in Bedrooms of Residences in Lower Austria***

Editor-in-chief's comment: The research group measured residential exposure to electromagnetic fields. The measurements were taken in 226 households, which in my view provides quite extensive data. The values measured were quite low and clearly below the exposure guidelines.

Source:

Tomitsch J, Dechant E and Frank W. Survey of electromagnetic field exposure in bedrooms of residences in Lower Austria. *Bioelectromagnetics* 2010;31:200-208

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No. 09



## ***Occupational Exposure of UK Adults to Extremely Low-Frequency Magnetic Fields***

Editor-in-chief's comment: In the UK, research has been conducted on occupational exposure to extremely low-frequency magnetic fields. The exposure was found to be highest for welders, printers and telephonists as well as for filing and other records assistants.

Source:

Mee T, Whatmough P, Broad L, Dunn C, Maslanyj M, Allen S, Muir K, McKinney P A, van Tongeren M. Occupational exposure of UK adults to extremely low frequency magnetic fields. *Occup Environ Med* 2009;66:619-627.

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No. 10

## ***A Biomonitoring Study of Genotoxic Risk to Workers of Transformers and Distribution Line Stations in Turkey***

Editor-in-chief's comment: The genotoxic risk due to exposure to magnetic fields amongst workers at transformer and distribution line stations has been studied in Turkey. According to the researchers, magnetic field exposure may increase the risk of genetic damage among electrical workers. The results are not directly applicable to Finland, for example, as there are significant differences in the working conditions and electric systems.

Source:

Celikler S, Aydemir N, Vatan O, Kurtuldu S and Bilaloglu R. A biomonitoring study of genotoxic risk to workers of transformers and distribution line stations. *International Journal of Environmental Health Research* 2009;19 (6):421-430

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No. 11

## ***Future Needs of Occupational Epidemiology of Extremely Low-Frequency Electric and Magnetic Fields: Review and Recommendations***

Editor-in-chief's comment: The writers discuss what kind of conclusions can be drawn from the health outcomes associated with exposure to extremely low-frequency electric and magnetic fields. They propose an international collaborative study to focus on ALS.

Source:



Kheifets L, Bowman J D, Checkoway H, Feychting M, Harrington J M, Kavet R, Marsh G, Mezei G, Renew D C, van Wijngaarden E. Future needs of occupational epidemiology of extremely low frequency electric and magnetic fields: review and recommendations. *Occup Environ Med* 2009;66:72-80

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No. 12

### ***Electromagnetic Hypersensitivity Mentioned by Only a Few Finns in a Survey***

Editor-in-chief's comment: The study makes an interesting observation: the way a survey question on electromagnetic hypersensitivity is phrased may affect the answers.

Source:

Korpinen, L. & Pääkkönen, R. 2009. Self-report of physical symptoms associated with using mobile phones and other electrical devices. *Bioelectromagnetics* 30, 5, pp. 431-437.

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No. 13

### ***Occupational Exposure to Electric and Magnetic Fields During Work Tasks at 110 kV Substations in the Tampere Region***

Editor-in-chief's comment: A Finnish study that investigated whether occupational exposure at 110 kV substations (in the Tampere region) exceeds the action value of the EU directive proposal. In some tasks, the action value of 10 kV/m recommended by the directive proposal is exceeded.

Source:

Korpinen L., Pääkkönen R. 2010. Brief communication, Occupational exposure to electric and magnetic fields during work tasks at 110 kV substations in the Tampere region. *Bioelectromagnetics* 31:252-254

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The Finnish situation report bulletin is funded by Fingrid Oyj. The Finnish Ministry of Employment and the Economy is contributing to the work of the project's management group. The archive is available at [www.leenakorpinen.fi](http://www.leenakorpinen.fi).

Tampere University of Technology. Department of Energy and Process  
Engineering. Situation Report Bulletin  
ISSN 1799-4608