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## **“Latest News” – archive of older items**

Latest news items from 2011 onwards appear on the current website.

Please note:

Links in this document are not maintained. Some may still work, but many will be broken.

## **2010**

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### **New ICNIRP exposure guidelines**

11/11/2010

[ICNIRP](#) is the International Commission on Non-Ionizing Radiation Protection. Among other activities, they produce exposure guidelines. Their [1998 exposure guidelines](#) form the basis of the [limits in place in the UK](#). They published new guidelines for the frequency range 1 Hz - 100 kHz in the December 2010 issue of [Health Physics](#).

See [full details of the 2010 guidelines](#)

ICNIRP have also published a [factsheet](#) on the new guidelines.

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### **Publication of CCRG magnetic fields results**

28/09/2010

The CCRG or "Draper" study is investigating childhood cancer rates in relation to high-voltage power lines in the UK. The first paper in 2005 looked just at distance to power lines. A new paper now looks at calculated magnetic fields from the power lines. It finds a raised relative risk for childhood leukaemia which, whilst based on very small numbers and not statistically significant, is consistent with previous results. But it also demonstrates that magnetic fields do not extend far enough from the power lines to explain the elevation with distance found previously.

See more details on:

- the [original distance paper](#)
  - the [new magnetic fields paper](#)
  - [other results on childhood leukaemia](#)
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## **Pooled analysis of childhood brain tumours**

24/08/2010

A pooled analysis of epidemiological studies of childhood brain tumours has been published. A pooled analysis is where you take the raw data from all the relevant individual studies and perform a single analysis on the pooled data.

It finds little evidence of an association with magnetic fields, in contrast to the equivalent analyses for [childhood leukaemia](#), which do find an association.

[more details on this study](#)

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## **Publication of SAGE Second Interim Assessment**

08/06/2010

SAGE is the UK's Stakeholder Advisory Group on ELF EMFs. It published its First Interim Assessment in 2007, which covered high-voltage power lines and house wiring. On June 8 2010 it published its Second Interim Assessment, which covers, principally, low-voltage distribution. It makes twenty or so recommendations, many endorsing existing best practice.

See:

- [details of the Second Interim Assessment](#)
  - more on [SAGE generally](#) and the [First Interim Assessment](#)
  - [SAGE's own website](#)
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## **Latest IET Position Statement**

02/06/2010

The Institution of Engineering and Technology (IET) has a Biological Effects Policy Advisory Group (BEPAG) which produces Position Statements every two years. The latest was published in June 2010 and the key conclusion is:

"BEPAG has concluded that the balance of scientific evidence to date does not indicate that harmful effects occur in humans due to low-level exposure to EMFs. This conclusion remains the same as that reached in its previous position statements, the last being in May 2008, and our findings have not been substantially altered by the peer-reviewed literature published in the past two years."

see:

- [more on the IET BEPAG on this site](#)
  - [BEPAG's own website](#)
- 

## Consent for Beauly-Denny power line

06/01/2010

On 6 January 2010, the Scottish Government gave approval to the Beauly-Denny power line. See for example [the BBC News coverage](#).

EMFs were raised extensively in the Inquiry process, but the Scottish Government imposed no restrictions or conditions relating to EMFs.

See [full details of the way EMFs were handled in this decision](#).

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## 2009

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### National Policy Statement on Electricity Networks

09/11/2009

The UK [Draft National Policy Statement for Electricity Networks Infrastructure \(EN-5\)](#) was published on 9 November 2009 and contains a section on EMFs.

The National Policy Statements (NPS) guide the new Infrastructure Planning Commission (IPC) on when to give consent to new developments. It sets out Government policies; the IPC then judge applications against these policies.

EMFs are covered in Section 2.9. The NPS proposes that new power lines should comply with the [ICNIRP basic restrictions](#) for any residential accommodation along the route of the line. Lines at 132 kV and below are automatically assumed to comply whereas evidence is

required for lines at 275 kV and 400 kV. Lines should have [optimal phasing](#) wherever possible and practicable. Re-routing lines or placing them underground is unlikely to be proportionate solely on EMF grounds.

These proposed provisions closely reflect the [Government statement of policy given in response to SAGE](#).

See [more details of EN-5 on this site](#)

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## Government response to SAGE

16/10/2009

SAGE is the Stakeholder Advisory Group on ELF EMFs. See [more on what SAGE is and what conclusions it has reached](#).

On 12 October 2009, Government On October 16 2009, Government [formally responded to these recommendations](#). See [full details of the response](#).

Essentially, the Government supports the implementation of low-cost options. This means it:

- supports [optimal phasing of power lines](#)
- does not support introducing "[corridors](#)"
- notes that replacing [rotating-disc electricity meters](#) with solid-state devices, and installing more [residual current devices in homes](#), is happening anyway
- does not support switching to [radial from ring circuits](#), which was not accepted by the Wiring Regulations Committee
- leaves it to appliance manufacturers to take action where they consider it desirable
- does not think it appropriate to introduce routine measurements of fields in homes
- supports providing more information on EMFs, particularly putting EMFs in context with other hazards

The Response also gives more details of how [public exposure limits](#) apply in the UK.

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## ICNIRP ELF consultation

30/07/2009

ICNIRP (the International Commission on Non-Ionizing Radiation Protection) have published a consultation draft on new ELF exposure guidelines. The consultation runs until October.

See [more details of the draft on this site](#) and [more on the existing ICNIRP guidelines](#).

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## SCENIHR research recommendations

06/07/2009

[SCENIHR](#) - the European Union's Scientific Committee on Emerging and Newly Identified Health Risks - have published [recommendations for research on EMFs](#). These are a follow-up to their update on the state of the science of EMFs issued in January 2009.

On ELF EMFs, their research recommendations are:

"Extremely low frequency fields

- Experimental studies relevant to possible carcinogenicity of ELF fields (laboratory studies using in vitro and/or animal models).
- Studies on the association between ELF magnetic fields and neurodegenerative diseases (epidemiological study (cohort study or register-based case-control study) on Alzheimer's Disease and laboratory study using animal and possibly in vitro models of Alzheimer's Disease).

Additional considerations

Environmental effects (comparison of selected ecosystem(s) before and after the installation of a new facility and/or located at varying field strengths from specific ELF EMF source(s))."

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## Developments in Austria and Germany

01/06/2009

There are legislative developments in Austria and Germany concerning requirements to bury power lines. We do not necessarily have a clear picture of all that is happening but we give such hard information as we have [here](#).

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## New Zealand: draft report on proposed power line

30/05/2009

A Board of Inquiry has been considering a proposal to build a major new high-voltage power line in New Zealand. Its draft ["Report and Decisions"](#) has now been published. On EMFs, it concludes:

"[888] In summary, the Board finds that there would not be significant risk to human health from operation of the grid upgrade in compliance with the proposed conditions."

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## Response by Commission to European Parliament motion

26/05/2009

Following the [motion on EMFs passed by the European Parliament](#), the European Commission have given their response in the form of an answer to the following question:

### WRITTEN QUESTION by Glenis Willmott (PSE) to the Commission

#### Subject: Exposure of the public to electromagnetic fields

Following the adoption by the European Parliament of resolution P6\_TA(2008)0410 on the mid-term review of the European Environment and Health Action Plan 2004-10, can the Commission detail how it has reacted to paragraphs 21, 22 and 23 of this resolution, regarding electromagnetic fields and the call for the Council to amend its Recommendation 1999/519/EC on the limitation of exposure of the general public to electromagnetic fields?

#### Answer given by Ms Vassiliou on behalf of the Commission

Since the adoption of the Parliament Resolution P6\_TA(2008)0410 the Commission has obtained from its Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) an updated opinion on the health effects of exposure to electromagnetic fields, adopted in January 2009. The opinion reviews the state of scientific knowledge in this area, based on all published data and using a weight of evidence approach.

For the radio frequencies (RF) to which the Honourable Member refers, the Committee concludes that from three independent lines of evidence (epidemiological, animal and in vitro studies) exposure to RF fields is unlikely to lead to an increase in cancer in humans. However, further studies are required to identify whether considerably longer term (well beyond ten years) human exposure might pose cancer risks. The Committee also concludes that for certain non-carcinogenic outcomes which have been studied (subjective symptoms, reproduction and development, effects on the nervous system) there is no scientific evidence of adverse effects of RF fields. There is some evidence that RF fields can influence electroencephalogram (EEG) patterns and sleep in humans but the health relevance of these findings is uncertain. The Committee recognises that there is limited information on the possible effects of RF field in children.

The Commission is considering the implications of the recent SCENIHR opinion. The available scientific knowledge does not provide evidence of the need to revise the limit values of Council Recommendation 1999/519/EC[1]. Moreover, in the absence of evidence of an association between exposure to RF and hypothetical health effects, it is impossible to determine revised exposure levels. Nevertheless, it appears urgent to complete the knowledge base in this area. Uncertainties in knowledge create concerns with citizens and must therefore be addressed. The Commission is asking SCENIHR to indicate priorities for research, including studies which could deliver useful results in the medium term in order to be in a

position to respond to public concerns and the requests of the Parliament on the basis of more complete scientific results.

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## Motion on EMFs in European Parliament

30/03/2009

The European Parliament is due to vote on 2 April on a motion 2008/2211(INI) about EMFs. The same motion was passed in the Committee on the Environment, Public Health and Food Safety on 17 February 2009. It is sometimes called the Ries Motion or Report after the Rapporteur, Frédérique Ries.

The [full text of the motion is available here](#) together with an official "Explanation" by the Rapporteur. The motion has more to say about radiofrequencies than power frequencies, and mainly calls for the Commission to take various actions, as Parliament itself doesn't have many powers in this area.

See also [more on EMFs in Europe](#)

The summary on the Parliament website is as follows:

"The Committee on the Environment, Public Health and Food Safety adopted the own-initiative report drawn up by Frédérique RIES (ALDE, BE) on health concerns associated with electromagnetic fields (EMFs).

The report recalls that wireless technology (mobile phones, Wi-Fi/WiMAX, Bluetooth, DECT landline telephones) emits EMFs that may have adverse effects on human health.

The dispute within the scientific community regarding the potential health risks arising from EMFs has intensified since 12 July 1999, when exposure limits for fields in the 0 Hz to 300 GHz range were laid down in Recommendation 1999/519/EC. Among the scientific projects arousing both interest and controversy is the Interphone epidemiological study, financed by an EU contribution of EUR 3 800 000, primarily under the Fifth Framework Programme for Research and Technological Development, the findings of which have been awaited since 2006. The purpose is to establish whether there is a link between use of mobile phones and certain types of cancer, including brain, auditory nerve, and parotid gland tumours.

The European Commission is called upon to review the scientific basis and adequacy of the EMF limits as laid down in Recommendation 1999/519/EC and report to the Parliament. MEPs call for particular consideration of biological effects when assessing the potential health impact of electromagnetic radiation and for active research to address potential health problems by developing solutions that negate or reduce the pulsating and amplitude modulation of the frequencies used for transmission.

As well as, or as an alternative to, amending European EMFs limits, the Commission, working in coordination with experts from Member States and the industries concerned, should draw up a guide to available technology options serving to reduce exposure to EMFs.

The committee calls on the Member States and local and regional authorities to create a one-stop shop for authorisation to install antennas and repeaters, and to include among their urban development plans a regional antenna plan.

MEPs consider that it is in the general interest to encourage solutions based on negotiations involving industry stakeholders, public authorities, military authorities and residents' associations to determine the criteria for setting up new GSM antennas or high-voltage power lines. In this context, it is important to ensure at least that schools, crèches, retirement homes, and health care institutions are kept clear, within a specific distance determined by scientific criteria, of facilities of this type.

The committee deplores the fact that, as a result of repeated postponements since 2006, the findings of the Interphone study have yet to be published. MEPs consider that it is up to the Commission to ask those in charge of the project why no definitive findings have been published and, should it receive an answer, to inform Parliament and the Member States without delay.

MEPs also stress the need to:

make available to the public, maps showing exposure to high-voltage power lines, radio frequencies and microwaves and to publish this information on the internet;

finance a wide-ranging awareness campaign to familiarise young Europeans with good mobile phone techniques;

increase research and development (R&D) funding for the evaluation of potential long-term adverse effects of mobile telephony radio frequencies;

launch, during the 2009-2014 parliamentary term, an ambitious programme to gauge the electromagnetic compatibility between waves created artificially and those emitted naturally by the living human body;

work with all relevant stakeholders (such as national experts, non-governmental organisations and industrial sectors) to improve the availability of, and access to, up-to-date information understandable to non-specialists on wireless technology and protection standards.

The committee proposes that the European Group on Ethics in Science and New Technologies (EGE) be given the additional task of assessing scientific integrity in order to help the Commission forestall possible cases of risk, conflict of interests, or even fraud that might arise now that competition for researchers has become keener.

The report encourages the introduction of a single standard designed to ensure that local residents would be subjected to as low a degree of exposure as possible when high-voltage grids were being extended. It also calls on the Member States to follow the example of Sweden and to recognise persons that suffer from electrohypersensitivity as being disabled so as to grant them adequate protection as well as equal opportunities."

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## **Do cows sense magnetic fields?**

25/03/2009



There has been evidence for a while that some birds use the earth's static magnetic field for navigation. But could larger animals such as cows and deer also sense the magnetic field?

Two scientific papers published in the Proceedings of the National Academy of Sciences of the USA have suggested that they might, and have also implicated power lines. They use Google Earth photographs to look at the orientation of grazing cows. The first paper suggests that cows (and deer) naturally orient themselves north-south. The second paper suggests that this north-south orientation can be disrupted by the presence of a power line.

These are controversial studies - not everyone seems ready to accept them or convinced of the relevance of bird and animal navigation to the EMFs produced by power lines - but they clearly deserve taking seriously.

The studies raise the issue of the relative direction of power-line fields and the earth's magnetic field. See [more information on the direction of magnetic fields from power lines](#).

Proc Natl Acad Sci U S A. 2008 Sep 9;105(36):13451-5. Erratum in:  
Proc Natl Acad Sci U S A. 2008 Nov 4;105(44):17206.

**Magnetic alignment in grazing and resting cattle and deer.**

Begall S, Cervený J, Neef J, Vojtech O, Burda H.

Department of General Zoology, Faculty of Biology and Geography, University of Duisburg-Essen, 45141 Essen, Germany.

We demonstrate by means of simple, noninvasive methods (analysis of satellite images, field observations, and measuring "deer beds" in snow) that domestic cattle ( $n = 8,510$  in 308 pastures) across the globe, and grazing and resting red and roe deer ( $n = 2,974$  at 241 localities), align their body axes in roughly a north-south direction. Direct observations of roe deer revealed that animals orient their heads northward when grazing or resting. Amazingly, this ubiquitous phenomenon does not seem to have been noticed by herdsman, ranchers, or hunters. Because wind and light conditions could be excluded as a common denominator determining the body axis orientation, magnetic alignment is the most parsimonious explanation. To test the hypothesis that cattle orient their body axes along the field lines of the Earth's magnetic field, we analyzed the body orientation of cattle from localities with high magnetic declination. Here, magnetic north was a better predictor than geographic north. This study reveals the magnetic alignment in large mammals based on statistically sufficient sample sizes. Our findings open horizons for the study of magnetoreception in general and are of potential significance for applied ethology (husbandry, animal welfare). They challenge neuroscientists and biophysicists to explain the proximate mechanisms.

Proc Natl Acad Sci U S A. 2009 Mar 19.

**Extremely low-frequency electromagnetic fields disrupt magnetic alignment of ruminants.**

Burda H, Begall S, Cervený J, Neef J, Nemec P.

Department of General Zoology, Faculty of Biology and Geography, University of Duisburg-

Essen, 45117 Essen, Germany;

Resting and grazing cattle and deer tend to align their body axes in the geomagnetic North-South direction. The mechanism(s) that underlie this behavior remain unknown. Here, we show that extremely low-frequency magnetic fields (ELFMs) generated by high-voltage power lines disrupt alignment of the bodies of these animals with the geomagnetic field. Body orientation of cattle and roe deer was random on pastures under or near power lines. Moreover, cattle exposed to various magnetic fields directly beneath or in the vicinity of power lines trending in various magnetic directions exhibited distinct patterns of alignment. The disturbing effect of the ELFMs on body alignment diminished with the distance from conductors. These findings constitute evidence for magnetic sensation in large mammals as well as evidence of an overt behavioral reaction to weak ELFMs in vertebrates. The demonstrated reaction to weak ELFMs implies effects at the cellular and molecular levels.

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## New SAGE website

20/03/2009

[SAGE](#) is the UK's Stakeholder Advisory Group on ELF EMFs. It looks at possible precautionary measures to reduce EMFs. In its First Interim Assessment published in April 2007, it looked at EMFs from [high-voltage power lines](#) and from [house wiring](#) and [appliances](#). There was then a lull in SAGE activity. It has now restarted, looking principally at EMFs from [distribution](#). It also now has a [new website](#). New material will be posted here, and the old material relating to the first phase of SAGE work will gradually be moved over.

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## Shift work and breast cancer

16/03/2009

There are [news stories](#) today that the Danish Government is paying compensation to women who have developed breast cancer after long spells working nights.

This is because shift work or work at night has been classified by the International Agency for Research on Cancer (IARC) as "probably" a cause of cancer. When IARC used the same classification scheme to look at EMFs, they classified magnetic fields as "possibly" a cause, one category lower in their scheme (and electric fields were even lower). The chief difference is the animal evidence - the evidence from humans was judged to be about the same strength in both cases ("limited"), but there was strong evidence for light at night or related factors causing cancer in rodents, whereas the evidence from animals for EMFs is "inadequate".

[More details on shift work and how the evidence compares to EMFs.](#)

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## New statement on EMFs from Europe

01/02/2009

SCENIHR is the European Union's Scientific Committee on Emerging and Newly Identified Health Risks. It issued a previous opinion on EMFs in 2007 and has now updated it (though the conclusions do not seem to have changed much). [Full details are here.](#)

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## Government response to SAGE: further delay

01/01/2009

SAGE is the UK's Stakeholder Advisory Group on ELF EMFs - see [much more information on it here](#). It produced its First Interim Assessment in April 2007. Government made an [initial response to that Assessment](#), including asking the Health Protection Agency for comments on it. Since then we have been waiting for a final Government response. We understood the Government Ministers involved - from Health, Communities and Local Government, and Energy and Climate Change - were due to meet in December 2008, but this was postponed. The latest information comes from a [Written Answer to a Parliamentary Question](#) in January 2009, which says the response will be "early in 2009".

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## 2008

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## New study on neurodegenerative disease in Switzerland

12/11/2008

A new study has been published in the American Journal of Epidemiology, of neurodegenerative disorders in Switzerland in relation to proximity to power lines. [See the press release by the university concerned.](#)

It reports an association between living within 50 m of a power line (particularly for longer periods) and Alzheimer's disease but not ALS, Parkinson's disease or multiple sclerosis.

This study adds to [the existing literature which we summarise here](#) including [a compilation of the abstracts of the epidemiological studies](#). In particular, the [most recent authoritative review of this subject](#) was by WHO in 2005, concluding:

"When evaluated across all the studies, there is only very limited evidence of an association between estimated ELF exposure and disease risk... Altogether, the evidence for an association between ELF exposure and Alzheimer's disease is inadequate."

The study was reported in some UK newspapers - the [Daily Express](#) and the [Daily Telegraph](#).

We give [more details of this study on a separate page](#).

Am J Epidemiol. 2008 Nov 5. [Epub ahead of print]

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

Huss A, Spoerri A, Egger M, Rösli M; for the Swiss National Cohort Study.

The relation between residential magnetic field exposure from power lines and mortality from neurodegenerative conditions was analyzed among 4.7 million persons of the Swiss National Cohort (linking mortality and census data), covering the period 2000-2005. Cox proportional hazard models were used to analyze the relation of living in the proximity of 220-380 kV power lines and the risk of death from neurodegenerative diseases, with adjustment for a range of potential confounders. Overall, the adjusted hazard ratio for Alzheimer's disease in persons living within 50 m of a 220-380 kV power line was 1.24 (95% confidence interval (CI): 0.80, 1.92) compared with persons who lived at a distance of 600 m or more. There was a dose-response relation with respect to years of residence in the immediate vicinity of power lines and Alzheimer's disease: Persons living at least 5 years within 50 m had an adjusted hazard ratio of 1.51 (95% CI: 0.91, 2.51), increasing to 1.78 (95% CI: 1.07, 2.96) with at least 10 years and to 2.00 (95% CI: 1.21, 3.33) with at least 15 years. The pattern was similar for senile dementia. There was little evidence for an increased risk of amyotrophic lateral sclerosis, Parkinson's disease, or multiple sclerosis.

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## Sense about Science October 2008

01/10/2008

The charity [Sense about Science](#) has published a report called "[Making sense of radiation: a guide to radiation and its health effects](#)."

On power lines and EMFs, it says:

"Pylons and EMFs have not been established as a cause of childhood leukaemia. Laboratory trials using animal models and other tests have found no biological mechanism to explain how EMF exposure from power lines could cause cancer."

Sense about Science describe themselves thus:

"Sense About Science ([www.senseaboutscience.org](http://www.senseaboutscience.org)) is an independent charitable trust that responds to the misrepresentation of science and scientific evidence on issues that matter to society. We work with scientists and civic groups to share the tools and insights of scientific reasoning."

Powerwatch have posted a [critical commentary](#) on this report.

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## EMF conferences September 2008

01/09/2008

The [Radiation Research Trust](#) organised a conference on "EMFs - a global issue" on September 8-9 at the Royal Society. There is an [account of the meeting](#) on the Powerwatch website and another one in the [Journal of Radiological Protection](#). The following day, there was a similar conference at the Institute of Physics.

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## Controversy over "Reflex" studies

01/08/2008

The "Reflex" project encompassed a number of laboratory studies into EMFs, funded by the EU.

There are allegations that some of the experiments performed at the medical University of Vienna are unreliable. These suggestions were first made by Alexander Lerchl from Germany. The suggestion is that a lab technician fabricated some data.

The head of the Reflex programme (Franz Adlkofer) and the now-retired head of the research group concerned (Hugo Rudiger) appear to have admitted that at least some data were fabricated. But it is unclear exactly how much has been admitted. We understand that they have agreed to withdraw one published paper but have not agreed to the University's request to withdraw another paper involving the same person.

The University ethics committee investigated these claims at meetings in June and July 2008. There was further controversy because it seems that the chair for the first hearing of the ethics committee was a lawyer who had previously worked for the mobile phone industry. However, a different chair was appointed for subsequent hearings. It appears that the University issued a press release stating that some data were fabricated.

The experiment was supposed to be conducted "blind", that is, the people performing the experiment could not tell when the field was on or off. But Christian Wolf wrote a Brief Communication to the journal Bioelectromagnetics where he stated that it was possible, if the

investigator wanted to, to tell when a coil was live and when not from a code displayed by the apparatus.

The experiment in question concerned radiofrequency radiation. But both the Reflex programme and the laboratory in question also performed experiments on ELF EMFs.

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## 2007

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### Government response to SAGE

01/12/2007

SAGE is the Stakeholder Advisory Group on ELF EMFs.

The HPA's formal [advice](#) to Government about the SAGE First Assessment and the Government [response](#) have now been published.

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### Delay to Physical Agents (EMF) Directive

01/10/2007

The EMF Physical Agents Directive was passed in Europe in 2004, and National Governments had until 2008 to bring it into national law. However, in October 2007, the European Commission announced a four-year delay. The intention is not just to delay the existing Directive but to use the extra time to rewrite it with different limits. This has been prompted largely by the realisation that the existing limits would restrict continued operation of MRI (Magnetic Resonance Imaging).

[More on the Directive on this site](#)

[More on the Commission website](#)

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### Bioinitiative Report

01/08/2007

The Bioinitiative Report has been produced by a grouping which describes itself as "An international working group of scientists, researchers and public health policy professionals". It concludes that existing exposure limits are insufficient to protect against EMFs.

See [more on Bioinitiative](#) on this website and on their own [web site](#)

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## Cross-Party Inquiry

18/07/2007

The Cross-Party Inquiry is a group of 5 MPs, funded by the charity Children with Leukaemia, who have been considering possible precautionary measures for EMFs. They published their report on July 18 2007.

The key recommendation is that the Government should introduce "corridors" along power lines where there would be a moratorium on new building.

see:

- [more detail](#) on this Inquiry
  - the [conclusions of SAGE](#) on the same issues
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## SAGE First Interim Assessment

01/04/2007

SAGE is the Stakeholder Advisory Group on ELF EMFs, the body analysing possible precautionary measures for EMFs and providing advice to Government. The SAGE First Interim Assessment was published in April 2007. It contains Recommendations for low-cost measures on house wiring, domestic appliances, and high-voltage power lines, and analyses, but recommends neither for nor against, an option for "corridors" round power lines.

See also:

The [SAGE](#) website (this is the new website address from 2008)  
[More detail on SAGE](#) on this website  
[download the Assessment](#) itself and supporting papers

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## SCENIHR Opinion

01/03/2007

SCENIHR is the European Commission's Scientific Committee on Emerging and Newly Identified Health Risks. It adopted an Opinion on "Possible effects of electromagnetic fields (EMF) on human health" in March 2007, having previously (September 2006) issued a preliminary version for public consultation.

See:

A [summary](#) of the Opinion on this site

The [full report](#)

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## Beaulieu-Denny Public Inquiry

01/02/2007

In the UK, a public inquiry has opened into proposals to build a new high-voltage power line in Scotland, from Beaulieu to Denny. EMFs seem likely to feature among other issues. Evidence, including evidence on EMFs, submitted both by the companies applying for the line and by objectors to the line can be seen at the Inquiry [web site](#).

Note: the web site you are now on - [www.emfs.info](http://www.emfs.info) - is maintained by National Grid. National Grid is not one of the companies involved in applying for this new power line.

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## 2006

### HPA REPORT ON MELATONIN February 2006

The [Health Protection Agency's](#) Advisory Group on Non-Ionising Radiation have published a Report on melatonin. They look separately at:

- whether magnetic fields affect melatonin levels in people and conclude that there is no consistent or convincing evidence to indicate that EMFs can affect the production or action of melatonin
- whether melatonin can affect the risk of breast cancer, and concludes that the



situation in humans is unclear.

- whether exposure to EMFs can affect the risk of breast cancer, and conclude that there is no consistent evidence for such an effect, nor has any mechanism for such a response been demonstrated.

See also:

- The [full report](#)
- The [HPA press release](#)

### **STUDY OF EMFs AND SURVIVAL FROM LEUKAEMIA January 2006**

Most previous studies on magnetic fields and childhood leukaemia have looked at whether the fields cause the disease. A new study is the first to look at whether the fields affect survival from the disease.

- [More](#) detail on this study

## **2005**

### **HPA REPORT ON ELECTRICAL SENSITIVITY NOVEMBER 2005**

[HPA](#) have published a new report written for them by an outside expert, Dr Neil Irvine. This report concentrates on describing the symptoms that are reported by electrosensitive people, rather than trying to decide whether these symptoms are caused by EMFs or not.

[More details](#)

### **MORE INFORMATION ON SOURCES OF FIELDS JULY 2005**

[HPA-RPD](#) have been investigating the sources of the fields in homes with high fields, greater than 0.4  $\mu$ T. They have found that 43% come from high-voltage overhead power lines, with the rest coming from low-voltage wiring both inside and outside the home.

[More](#) detail on this study

### **PUBLICATION OF CCRG STUDY June 2005**

The CCRG epidemiological study of childhood cancer and proximity to power lines in the UK published its first results in the British Medical Journal in June 2005.

The study looked at roughly 30,000 cases of childhood cancer from 1962 to 1995 in England and Wales and calculated the distance of the birth address to the nearest high-voltage power line.

It found “While few children in England and Wales live close to high voltage power lines at birth, there is a slight tendency for the birth addresses of children with leukaemia to be closer to these lines than those of matched controls.”

[more detail](#) on this study.

For the electricity industry response to this study click [here](#) [link no longer working November 2011]

For responses by other organisations click [here](#)

### **NRPB BECOME PART OF HPA April 2005**

On 1 April 2005, the National Radiological Protection Board (NRPB) became part of the [Health Protection Agency](#) (HPA). They are now the [Radiation Protection Division](#) of HPA, part of the Centre for Radiation, Chemical and Environmental Hazards.

## **2004**

### **MEDIA REPORTS OF CHILDHOOD CANCER AND POWERLINES October 2004**

In October (and also previously in September), the UK media carried reports that a study of childhood cancer and power lines in the UK had found an excess of cases close to lines.

The study concerned is an epidemiological study being conducted by the [Childhood Cancer Research Group](#) at the University of Oxford. Roughly 30,000 cases from 1963 to 1995 have been compared with matched controls and the distance to the nearest National Grid (275 kV and 400 kV) overhead power line calculated by National Grid Transco.

The study has been submitted to a peer-reviewed journal. Until it is published, it is not appropriate to comment on the claimed results, and it is not possible to assess the methodology or what the various possible interpretations of any result might be.

Update: the study was published in June 2005. See separate news item above.

### **WHO PRECAUTIONARY FRAMEWORK**

The WHO have posted on their web site the latest version of their Precautionary Framework, which has two case studies applying the Framework to power-frequency and radio-frequency EMFs.

The Framework says that decisions about what precautionary actions to take should be based on a cost-benefit analysis, but one that takes account of social and ethical factors. Applied to power-frequency EMFs, WHO say that

“Under the WHO Precautionary Framework, [childhood leukaemia] warrants a thorough consideration of precautionary measures including detailed cost-benefit or cost-effectiveness analyses”

and

“...even after fully allowing for the legitimate desire by society to err on the safe side, it seems likely that only very low-cost measures will be justified.”

## **GOVERNMENT RESPONSE TO NEW NRPB ADVICE**

The Government's formal response to the NRPB's recommendation in March 2004 that the UK adopt the ICNIRP exposure guidelines has now been published on the [Department of Health](#)'s web site.

The Government state:

“.. the Government expects the NRPB guidelines to be implemented in line with the terms of the EU Recommendation, that is, taking account of the risks and benefits of action. Preliminary discussions have already taken place to identify what reasonable actions might be taken.”

On precautionary measures, they state:

“The Government will be exploring further the practical applications of precautionary measures within a stakeholder engagement process. This will be the subject of wide consultation and will explore any risks and benefits arising in the same manner as a Regulatory Impact Assessment.”

## **NEW NRPB ADVICE ON EXPOSURE LEVELS March 2004**

On March 31 2004 the NRPB published new advice on levels of exposure. They recommend that the international levels set by ICNIRP be adopted in the UK. These are the same as the present NRPB levels for occupational exposure, but lower for the public, by a factor of 5 at power frequencies, based on a more cautious interpretation of the

science.

This is advice to Government, and Government will now have to decide if and how to implement it.

The ICNIRP guidelines, like the NRPB guidelines, set restrictions on exposure to prevent adverse health effects for which there is clear evidence and whose mechanisms are understood. The NRPB note that uncertainties in the science remain, particularly those associated with epidemiological studies. Although these studies do not provide a sound basis for quantifying exposure guidelines, the NRPB consider they indicate that further precaution may be appropriate in respect of some EMF exposures.

For more detail, see:

[The NRPB advice on exposure levels](#)

[The accompanying review of the science by NRPB](#)

[The NRPB's response to the comments they received during their consultation exercise](#)

More [detail](#) on exposure limits in this and other countries.

### **NRPB REPORT ON PARTICLE DEPOSITION IN THE VICINITY OF POWER LINES (March 2004)**

In March 2004 the NRPB's Advisory Group (AGNIR) published a report into the suggested mechanisms whereby power lines might have an effect on airborne particles. It concluded:

“...it seems unlikely that corona ions would have more than a small effect on the long-term health risks associated with particulate air pollutants, even in the individuals who are most affected. In public health terms, the proportionate impact will be even lower because only a small fraction of the general population live or work close to sources of corona ions.”

and

“Any health risks from the deposition of environmental particulate air pollutants on the skin appear to be negligible.”

See also:

The [complete report on the NRPB web site](#)

Key extracts from the summary and conclusions

A response to the report from [Bristol University](#) (link no longer available 2008)

More [information](#) on the background to these theories and other statements about them

### **DEMONSTRATIONS OF FLUORESCENT TUBES UNDER POWER LINES**

The Artist in Residence at Bristol University Physics Department, Richard Box, has beautifully demonstrated how fluorescent tubes can glow under a power line. This is an

effect of the electric field produced by the power lines, but the current required to produce a visible glow from a fluorescent tube is very low, and besides demonstrating rather elegantly the presence of the field, this phenomenon has no known implications for human health.

[More on why fluorescent tubes light under power lines](#)

## 2003

### **DEVELOPMENTS ON THE EUROPEAN DIRECTIVE ON EMFS**

The European Union are developing a Directive on occupational exposure to EMFs. For more details see [exposure limits](#).

In December 2003 the Commission and Council reached a [Common Position](#) which they passed to the Parliament's Employment and Social Affairs Committee. That Committee will debate it and then pass it to the full Parliament. The Committee appointed Senor Alvarez as Rapporteur. He has produced a [report](#) including some proposed amendments. Other MEPs have also tabled [amendments](#).

On March 18 2004 the Committee adopted five of the amendments and rejected the rest. On March 30 the full Parliament accepted the same five amendments.

The Common Position is very close to the ICNIRP [exposure guidelines](#). The main effect of the proposed amendment would be to extend to requirements for health surveillance.

### **RESPONSES TO THE NRPB CONSULTATION ON EXPOSURE GUIDELINES July 2003**

The NRPB public consultation on exposure guidelines closed on 28 July. As far as we are aware, NRPB has not released any of the responses it received nor stated how many.

Update: in July 2004 the NRPB published a Report discussing the responses it received, available [here](#). (link no longer available 2008)

The UK Electricity Industry response is available here (no longer available).

We have also compiled links (no longer available) to all the other responses we are aware of that are available on the internet. We will add any others that we may have missed if you would like to bring them to our attention.

## **NRPB/BRUNEL UNIVERSITY PAPER ON MAGNETIC FIELDS AND CHROMOSOME DAMAGE June 2003**

On 11 June 2003, the British Journal of Cancer published research by scientists at the National Radiological Protection Board and Brunel Institute for Bioengineering.

The research looked for chromosome damage at magnetic fields up to 700  $\mu$ T, and found none. Nor was there any change in the natural DNA repair mechanisms that would come in to play after such damage.

This finding reinforces the generally accepted position is that whilst there are some suggestions from epidemiology that magnetic fields are linked with childhood leukaemia, there is little support from biology. It looked at only one particular possible effect of magnetic fields, and clearly therefore cannot on its own rule out other possibilities.

The research was funded by the EMF Biological Research Trust. The Trust receives funding from National Grid, but is independent from industry. It decides which projects to support through a Scientific Advisory Committee chaired by Professor Mike Crumpton FRS, on which industry has no say whatsoever. The only request National Grid makes in exchange for its funding is that all studies undertaken should be openly published in the peer-reviewed scientific literature, as this study has been.

The study reference is

P Hone, A Edwards, J Halls, R Cox and D Lloyd. Possible associations between ELF electromagnetic fields, DNA damage response processes and childhood leukaemia. British Journal of Cancer, volume 88 number 12, pp 1939-1941 2003.

It is available on the British Journal of Cancer web site (link no longer available July 2009)

Press releases about the study have been issued by [NRPB](#) and Cancer Research UK (link no longer available 2008)

On this site, see also more on the scientific evidence on [childhood leukaemia](#), the [different types of research](#) that are performed and the relation between them, and the [EMF Biological Research Trust](#).

## **NRPB PUBLIC CONSULTATION ON EXPOSURE GUIDELINES May 2003**

On 1 May 2003 NRPB published a consultation document "Proposals for Limiting Exposure to Electromagnetic Fields (0-300 GHz)" on its web site. It invites comments from the public with the consultation period running till 28 July. The NRPB embarked on this review of its current exposure guidelines, which date from 1993, in 2002. The terms of reference of the review can be found in Hansard. It conducted a consultation with selected recognised experts in Autumn 2002 and held a public meeting in December 2002.

The NRPB's role is to provide scientific advice to Government. It will be for Government

to receive the revised NRPB guidance following the consultation and decide what action to take (e.g., whether and how to implement it).

The document proposes the adoption of the ICNIRP exposure guidelines. For power frequencies, these differ from the present NRPB guidelines principally in that the levels for the general public are a factor of 5 lower than the present levels for occupational exposure (which are unchanged). The document includes detailed reviews of the scientific evidence on EMFs. It also recommends a discussion undertaken collectively by all stakeholders on the applicability of the Precautionary Principle to EMFs, to contribute to advice to government.

For more information see:

The consultation document on the NRPB's web site (no longer available 2006)

On this web site, more information on [exposure limits](#) and the NRPB's various [statements on EMFs](#)

## 2002

### **DRAFT EUROPEAN DIRECTIVE ON OCCUPATIONAL EXPOSURE TO EMFs (DECEMBER 2002)**

In December 2002 the European Commission issued the draft text of a proposed Directive. This Directive would be the third in a series of Physical Agents Directives (following Vibrations and Noise) and would apply to occupational exposure to EMFs.

The draft text is based round the ICNIRP exposure guidelines. It proposes Limit Values equal to the ICNIRP basic restrictions ( $10 \text{ mA m}^{-2}$  at power frequency) and Action Values equal to the ICNIRP reference levels ( $500 \text{ } \mu\text{T}$  and  $10 \text{ kV m}^{-2}$ ). However, it proposes more onerous actions at these levels than ICNIRP requires.

In the UK, the Health and Safety Executive have started consulting about the likely impact of this draft proposal.

For more information, see:

The [exposure limits and guidelines](#) section of this web site

The part of the [HSE web site](#) dealing with EMFs

### **NRPB PUBLIC MEETING (DECEMBER 5 2002)**

On December 5 2002, the NRPB held a public meeting on powerlines and health at the NEC, Birmingham. Members of a panel drawn from the NRPB, its Advisory Groups and the WHO answered questions from an audience of over a hundred.

In the afternoon, some of the UK Interest Groups organised a follow-on meeting. One of

the presentations given at that meeting is available on the web: by [Professor O'Carroll](#).

## **CALIFORNIA DEPARTMENT OF HEALTH SERVICES REPORT May 2002**

The California Department of Health Services [EMF project](#) has produced various draft Risk Evaluations on EMFs; the [final version](#) was produced in May 2002.

The review was conducted by three scientists employed by the Department. Their conclusions were:

“To one degree or another all three of the DHS scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig’s Disease, and miscarriage.

They strongly believe that EMFs do not increase the risk of birth defects, or low birth weight.

They strongly believe that EMFs are not universal carcinogens, since there are a number of cancer types that are not associated with EMF exposure.

To one degree or another they are inclined to believe that EMFs do not cause an increased risk of breast cancer, heart disease, Alzheimer’s Disease, Depression, or symptoms attributed by some to a sensitivity to EMFs. However,

All three scientists had judgments that were close to the dividing line between believing and not believing that EMFs cause some degree of increased risk of suicide, or

For adult leukemia, two of the scientists were close to the dividing line between believing and not believing and one was prone to believe that EMFs cause some degree of increased risk.”

The conclusions reached in the draft document appear to be inconsistent with those reached by, for example, the NRPB Advisory Group and IARC. Serious criticisms of the draft report have been made by various eminent independent scientists as part of the process of public comment.

More on the [California review](#) and [other reviews of the science](#)

## **NRPB STATEMENT ON MISCARRIAGES APRIL 2002**

A [statement](#) by the NRPB’s Advisory Group on “Magnetic fields and miscarriage”, April 2002 discusses two papers on magnetic fields and miscarriage from California. It concludes:

### **Conclusion**

Neither study provides substantial evidence of increased risk of miscarriage attributable to exposure to above average magnetic fields and neither justifies regulatory action. It would be expensive and difficult to carry out further epidemiological investigation that would



address the issue robustly and, in the absence of a plausible biological mechanism that would link such exposure to miscarriage, it is arguable whether it would be justifiable to support research of this type. If further study is required, it would be worth financing only if a large cohort of (say) 2000 women could both be interviewed and have measurements made of their exposures over a period of at least 24 hours less than 8 weeks after their last menstrual period and have repeat measurements made on at least two further occasions within the next 8 weeks to determine the consistency of the exposures throughout early pregnancy and their temporal relationship to miscarriage.

More on [miscarriages](#) and the NRPB's [other reviews](#) on cancer and neurodegenerative disorders

## 2001

### **NRPB ADVISORY GROUP REPORT ON NEURODEGENERATIVE DISORDERS (NOVEMBER 2001)**

In November 2001 the NRPB's Advisory Group published a further Report [on electromagnetic fields and neurodegenerative disease](#). The conclusion was:

“There is no good ground for thinking that exposure to extremely low frequency electromagnetic fields can cause Parkinson's disease and only very weak evidence to suggest it could cause Alzheimer's disease. The evidence that people employed in electrical occupations have an increased risk of developing amyotrophic lateral sclerosis is substantially stronger, but this could be because they run an increased risk of having an electric shock rather than any effect of long-term exposure to the fields per se.”

See more information on the [NRPB](#) and on [neurodegenerative disorders](#)

### **PLANNING DECISION IN LOGAN, AUSTRALIA (NOVEMBER 2001)**

A recent decision relating to a city called Logan in Australia has attracted some publicity. A utility company, Energex, applied for permission to install some new equipment. Permission was initially refused, and the matter went to the Queensland Planning and Environment Court in November 2001. In fact, by the time of the hearing, Logan City Council and Energex had already reached agreement, and the Court simply endorsed that agreement. The agreement included some clauses stating that the magnetic field would not exceed 0.4  $\mu\text{T}$  in certain specified locations in specified properties (the locations specified are some way back from the actual lines which run along the street). These conditions would, in fact, be met by the design of the installation originally proposed by Energex, without any alteration or modification.

Thus, this seems to be a case of pragmatic agreement reached between a company and a

local authority. It does not seem to have been imposed on them by the Court or anyone else, it does not limit the maximum field produced by the equipment, and it does not seem to change the exposure limits which apply across Australia as a whole.  
See [exposure limits and guidelines](#)

### **REPORT FROM CSTEE, EUROPEAN COMMISSION (OCTOBER 2001)**

The most recent scientific opinion of the European Commission on EMFs was produced in October 2001 by CSTEE – the Scientific Committee on Toxicity, Ecotoxicity and the Environment. [full text](#)

Their key conclusion on power frequencies was:

Combined analyses of the epidemiological studies on the association between exposure to ELF and childhood leukaemia have strengthened the evidence of an association. However, given some inconsistencies in exposure measurements and the absence of other criteria commonly used in assessing causality (particularly a plausible explanation of underlying biological mechanisms, (see above), the association does not meet adequate criteria for being considered casual. Thus the overall evidence for 50/60 Hz magnetic fields to produce childhood leukaemia must be regarded as being limited\*(\*)).

more on developments in [Europe](#) and other [reviews of the science](#)

### **UK STUDY OF BRAIN CANCER IN POWER WORKERS (OCTOBER 2001)**

A paper in the October 2001 issue of “Occupational and Environmental Medicine” (OEM) reports on an epidemiological study of brain cancer and occupational exposure to magnetic fields among electricity workers in the UK. The study was conducted on a database of 84,000 staff who worked at the former Central Electricity Generating Board in the late 1970s.

A previous analysis of brain cancer was published in 1997. The present analysis includes more cases and uses a new, state-of-the-art exposure assessment procedure. The analysis was conducted by the University of Birmingham Institute of Occupational Health, with the exposure assessment by National Grid.

The new research confirmed the 1997 study in finding no evidence of an association between brain cancer and exposure to magnetic fields. The paper concluded:

“There is no discernible excess risk of brain tumours as a consequence of occupational exposure to magnetic fields in United Kingdom electricity generation and transmission workers.”

The paper is accompanied by an OEM editorial which states:

“We may well be doing a disservice not to share the good news more energetically and widely - electric utility workers and other similar such workers do not seem to be at

measurably increased risk of brain cancer”.

[Occupational exposure to magnetic fields in relation to mortality from brain tumours: updated and revised findings from a study of UK electricity generation and transmission workers. 1973-97; T Sorahan, L Nicholas, M van Tongeren, JM Harrington, Institute of Occupational Health, University of Birmingham. Occupational and Environmental Medicine 2001;58:626-630 (October)]

[more](#) on research involving this cohort of workers

The paper is available (to subscribers or by one-off payment) from the Journal's web site <http://oem.bmjournals.com/> and you can read the abstract [here](#)

### **CALIFORNIA DEPARTMENT OF HEALTH SCIENCES EVALUATION OF POSSIBLE RISKS FROM EMFs (JULY 2001)**

For more recent developments on this, see May 2002

In July 2001, California Department of Health Sciences released draft documents (labelled "do not cite or quote") on

EMF Risk Evaluation and Policy Options, for public comment. The draft Risk Evaluation classifies electric and magnetic fields and various diseases, using two different schemes: one, the same scheme used by IARC, and the other, a direct estimate of the likelihood that EMFs can cause various diseases. In both cases, the classification was made by three individual scientists who all work for the Department. Their conclusions suggested that EMFs were a possible (and even in some cases a probable) cause of increased risk for a number of health conditions, notably childhood and adult leukaemia, adult brain cancer, miscarriage and amyotrophic lateral sclerosis. These conclusions are out of line with recent authoritative reviews of the science performed by the [NRPB](#) and [IARC](#). There is now a process of public comment on the drafts.

This early draft has been superseded by the [final version](#)

The documents also contain details of two epidemiological studies, which appear to find a statistical association

between miscarriage and one particular measure of exposure, namely the peak level of exposure to magnetic fields.

However, there are a number of flaws with the studies, notably very low participation rates, and it is not possible to draw any firm conclusions.

### **INTERNATIONAL AGENCY FOR RESEARCH ON CANCER CLASSIFICATION OF EMFS (JUNE 2001)**

The International Agency for Research on Cancer (IARC) is an agency of the World Health Organisation. The IARC Monographs' series publishes authoritative independent assessments by international experts of the risks of cancer posed to humans by a variety of agents, mixtures and exposures. Since its inception in 1972, the series has reviewed more than 860 agents.

In June 2001, IARC convened a working group to examine the evidence and classify EMFs. The classification was made according to the scheme set by IARC, and relates to cancer only, not to any other diseases. According to this scheme, the evidence from humans (ie epidemiological studies) and from animals is first judged separately, and these two verdicts are then combined into an overall classification. For extremely-low-frequency ELECTRIC fields, IARC's classification was "not classifiable" due to "inadequate" evidence in both humans and animals.

For extremely-low-frequency MAGNETIC fields, IARC's classification was "possibly" a cause of cancer, based on "inadequate" evidence in animals, "inadequate" evidence in humans for most types of cancer, but "limited" evidence in humans for childhood leukaemia.

[More](#) on IARC including links to their web site and other [reviews of the science](#)

The NRPB issued a statement in response to the IARC working group stating that the findings were consistent with the AGNIR report of March 2001. They restated the AGNIR findings that:

"Laboratory experiments have provided no good evidence that extremely low frequency electromagnetic fields are capable of producing cancer, nor do epidemiological studies suggest that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher power frequency magnetic fields is associated with a small risk of leukaemia in children. In practice, such levels of exposure are seldom encountered by the general public in the UK. In the absence of clear evidence of a carcinogenic effect in adults or of a plausible explanation from experiments on animals or isolated cells, the epidemiological evidence is currently not strong enough to justify a firm conclusion that such fields cause leukaemia in children."

### **UK STUDY OF LEUKAEMIA IN POWER WORKERS (MAY 2001)**

In the late 1970s, a cohort (large sample) was set up of all the then staff of the Central Electricity Generating Board (CEGB). This included around 84,000 people. This group is being monitored for cause of death and any association with magnetic fields.

A study of brain tumours, published in January 1997 in the Journal of Occupational and Environmental Medicine found no association with magnetic fields. The May 2001 issue of the same journal included a paper analysing deaths from leukaemia from the same sample of UK power workers.

The study looked for any association with exposure to magnetic fields, using a novel, state-of-the-art method for assessing magnetic-field exposure, developed by staff at National Grid.

The paper concludes:

"There are no discernible excess risks of leukaemia as a consequence of occupational exposure to magnetic fields in United Kingdom electricity generation and transmission workers."

[Leukaemia mortality in relation to magnetic field exposure: findings from a study of

United Kingdom electricity generation and transmission workers, 1973-97. J M Harrington, L Nichols, T Sorahan, M van Tongeren, Institute of Occupational Health, University of Birmingham. Occup Environ Med 2001;58:307-314 ( May )]  
[more](#) on research on this cohort of workers including the [full abstract](#)

#### **NRPB ADVISORY GROUP REPORT (MARCH 2001)**

On 6 March 2001, the National Radiological Protection Board's (NRPB) Advisory Group on Non-Ionising Radiation (AGNIR) released a comprehensive report titled "ELF Electromagnetic Fields and the Risk of Cancer". The report surveyed the evidence relating to electric and magnetic fields and cancer, concentrating on the studies published since 1992, the last time AGNIR published a major review of the literature.

##### **The Advisory Group stated:**

"for the vast majority of children in the UK there is now considerable evidence that the electromagnetic field levels to which they are exposed do not increase the risk of leukaemia or other malignant disease."

##### **However, they also noted:**

"the possibility remains that intense and prolonged exposures to magnetic fields can increase the risk of leukaemia in children" but "the epidemiological evidence is currently not strong enough to justify a firm conclusion that such fields cause leukaemia in children."

##### **For adults, they noted:**

"There is no reason to believe that residential exposure to electromagnetic fields is involved in the development of leukaemia or brain tumours in adults."

##### **On occupational exposure they said:**

"causal relationships between such exposure and an increase in tumour incidence at any site are not established."

##### **In response to this report, NRPB stated:**

"The Board considers that the AGNIR report provides no additional scientific evidence to require a change in exposure guidelines."

[More](#) on reviews of the science including this one For the contents and conclusions of this report, and NRPB press release and response statement [click here](#)

#### **GERMAN EPIDEMIOLOGICAL STUDY OF MAGNETIC FIELDS AND CHILDHOOD LEUKAEMIA (MARCH 2001)**

An epidemiological study of magnetic fields and childhood leukaemia was published in the International Journal of Cancer in March 2001. The study involved measurements of fields for 500 children with leukaemia across the whole of the former West Germany. This was a smaller study than the UK or USA studies, but still fairly large by EMFs study

standards.

The study found a statistical association between fields and leukaemia. It found only a weak relation between 24-hour-average fields and cancer but a stronger relationship between night-time fields (a relative risk of 3.2, statistically significant).

These results are broadly consistent with the pooled analysis of magnetic fields and childhood leukaemia published in 2000, which also identified a statistical association between the highest exposures and leukaemia. The consideration of night-time exposures, however, is unique to this study.

Like all epidemiological studies, this study can only observe statistical associations, and cannot establish cause-and-effect relationships, ie that the observed cases of leukaemia were caused by magnetic fields. The authors concluded that:

“Our study provides evidence for a weak association between childhood leukaemia and exposure to residential power-frequency magnetic fields. An explanation for this association remains unclear.”

**They also said that:**

“although our study shows an association between childhood leukaemia and exposure to residential magnetic fields, it is neither a proof nor a breakthrough.”

[More](#) on this study and others of childhood leukaemia

## 2000

### **UKCCS CHILDHOOD CANCER AND RESIDENTIAL PROXIMITY TO POWER LINES (NOVEMBER 2000)**

A paper entitled "Childhood cancer and residential proximity to power lines", by the UK Childhood Cancer Study (UKCCS) investigators, was published on 14 November 2000 in the British Journal of Cancer. This was the second major report of a series of EMFs related research studies being undertaken by the UKCCS investigators.

**The study concluded that:**

"There is no evidence that either proximity to electrical installations or the magnetic field levels they produce in the UK is associated with increased risk of childhood leukaemia or any other cancer."

This supported the conclusion of the first major EMFs related study by UKCCS published in The Lancet on 3 December 1999. Entitled "Exposure to power frequency magnetic fields and the risk of childhood cancer: a case-control study," the paper stated that:

"This study provides no evidence that exposure to magnetic fields associated with the

electricity supply in the UK increases risks for childhood leukaemia, cancers of the nervous system, or any other childhood cancer."

This UKCCS paper superseded the results of the magnetic field study in relation to proximity to power lines. The previous data [included in the magnetic field study] "has on occasion been interpreted incorrectly as indicating the effects of proximity" stated this report.

The paper specifically concerned proximity to power lines and other electricity supply equipment. Because it was concerned with distances measured from maps with calculations and did not depend on any measurements, the study was able to include subjects which had to be excluded from the magnetic field study because they had no measurements. Thus, this study contained 3380 cases and 3390 controls compared with the 2226 used for the magnetic fields paper, representing a significantly larger number.

The paper examined power lines at all voltages from 6.6 kV to 400 kV, and a range of distances from the lines from 50 m to 400 m. None of the relative risks were found to be statistically significant and all were close to unity, indicating no association.

[More](#) on the UKCCS

#### **POOLED ANALYSES OF CHILDHOOD LEUKAEMIA AND MAGNETIC FIELDS (2000)**

During 2000, two pooled analyses studies of childhood leukaemia and magnetic fields were published. A pooled analysis study does not contain any new data. Instead, it combines data from previously published studies in order to provide a single statistical analysis.

The two studies differed slightly in their selections of previous work and in the way the data was analysed but reached similar conclusions.

Both found that statistically, there was no suggestion of an increased risk of childhood leukaemia at the magnetic field levels to which the majority of children are exposed. Although at the highest exposures (24-hour or longer average fields in homes of greater than 0.4  $\mu$ T) there was a statistical finding of increased risk, one of the papers commented that "The explanation for the elevated risk is unknown." As these pooled analyses do not provide new data, and have only limited ability to correct for methodological flaws in the contributing studies, the same paper concluded that, "selection bias may have accounted for some of the increase."

[More](#) on the pooled analyses and other studies of childhood cancer

## **1999**

#### **UK CHILDHOOD CANCER STUDY MAGNETIC FIELD RESULT (DECEMBER**



**1999)**

For full details of all UKCCS EMF publications, see [UKCCS](#)

The first results from the United Kingdom Childhood Cancer Study have been published. For over six years, a major epidemiological study of childhood cancer has been underway in the UK, known as the United Kingdom Childhood Cancer Study (UKCCS). It has been looking at a number of suggested causes of childhood cancer, including magnetic fields, and the magnetic-field result was the first to be published, on 3 December 1999 in the Lancet.

**The main conclusion of the paper was:**

“This study provides no evidence that exposure to magnetic fields associated with the electricity supply in the UK increases risks for childhood leukaemia, cancers of the central nervous system, or any other childhood cancer.”

The main hypothesis was that for leukaemia and/or central nervous system (CNS) tumours, risk would be elevated amongst children with exposure greater than 0.2 microteslas, compared to children with exposure of less than 0.1 microtesla. In fact, for both these diseases, the adjusted odds ratios were less than 1 (indicating no association of exposure and disease), being 0.90 for leukaemia and 0.46 for CNS tumours. The odds ratio for all cancers combined was 0.87, again less than 1.

Although it was the electricity industry that suggested to the researchers that they include magnetic fields in their study, and through the EA the industry has provided the necessary funding, the conduct of the study has been independent of the industry. The study is the largest of its kind ever to be performed in the UK, with every case of childhood leukaemia occurring in the UK over a four-year period eligible for inclusion. Its methodology, and in particular the exposure assessment, were state-of-the-art.

**RESEARCH BY PROFESSOR HENSHAW AND DR PETER FEWS AT BRISTOL UNIVERSITY (DECEMBER 1999)**

For a full discussion of this issue, see [electric fields and ions](#)

In 1996, Denis Henshaw, Professor of Physics at Bristol University, suggested that electric fields produced by the overhead transmission lines may affect radioactive radon "daughter products", and that this might be the link between EMF and disease. Subsequently, he made further suggestions that fields could affect other airborne particulates at a conference organised by the University of Bristol in September 1998.

When subjected to detailed scientific scrutiny, Professor Henshaw's were criticised on theoretical grounds by scientists at the UK National Radiological Protection Board (NRPB). Experimentally, two independent groups (Dr Miles from the NRPB and Dr McLaughlin from Dublin) looked for and failed to find some of the effects predicted by Professor Henshaw.

Further theories were put forward by Professor Henshaw on the increased deposition of charged particles on surfaces near to power lines in December 1999.



### **THE US NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SERVICES (NIEHS) DIRECTOR'S REPORT TO THE US CONGRESS (JUNE 1999)**

For further information on this [click here](#)

As part of the conclusion of the USA Federal Government's six year research programme on EMF, the Research and Public Information Dissemination Program (EMF-RAPID Program), the Director of the NIEHS issued a report to Congress in June 1999. While sections of the report say EMF exposure "cannot be recognised as entirely safe", the report concluded:

"The NIEHS believes that the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm."

### **CANADIAN CHILDHOOD CANCER EPIDEMIOLOGICAL STUDIES (APRIL AND JUNE 1999)**

During 1999, the results of two different epidemiological studies of EMF and childhood cancer in Canada were published. The first, and larger of the two, by Dr Mary McBride from the British Columbia Cancer Agency and others, was published in April, with the second and smaller, by Dr Lois Green from the University of Toronto and others, was published in June.

The McBride study found no suggestions of a link between cancer and either measured fields or "wire codes". The Green study, which was half the size and which has been criticised on methodological grounds by some scientists, did find some statistical associations, though the lead author Lois Green herself said "...this study does not establish that magnetic fields cause cancer".

[More](#) on studies of childhood cancer

## **1998**

### **THE US NATIONAL INSTITUTE OF ENVIRONMENT HEALTH SERVICES (NIEHS) WORKING GROUP REPORT (1998)**

As part of the US Government's EMF-RAPID programme, the National Institute of Environmental Health Services (NIEHS) set up a working group in 1998 to examine all the evidence relating to EMFs. They expressed their conclusions using the criteria of the International Agency for Research on Cancer (IARC). IARC have five categories:

- The agent is carcinogenic

- The agent is probably carcinogenic
- The agent is possibly carcinogenic
- The agent is not classifiable
- The agent is probably not carcinogenic

No one on the working group voted for "is carcinogenic" or "probably carcinogenic". 19 members voted for "possibly carcinogenic", 9 for "not classifiable" and 1 for "probably not carcinogenic".

More on [NIEHS](#) and other reviews of the science

## 1997

### **THE US NATIONAL CANCER INSTITUTE (NCI) STUDY (1997)**

In July 1997, the results of an epidemiological study into EMF and childhood leukaemia, conducted by the NCI in the USA, were published ("Residential exposure to magnetic fields and acute lymphoblastic leukaemia in children", Martha Linet et al, The New England Journal of Medicine Vol 337 no 1 pp1-7). The study authors' conclusion was:

"our results provide little evidence that living in homes characterised by high measured time-weighted average magnetic-field levels or by the highest wire-code category increases the risk of ALL (Acute Lymphoblastic Leukaemia) in children".

[More](#) on this study and others of childhood cancer