

NORTH LANARKSHIRE COUNCIL

REPORT

TO: SPECIAL MEETING OF PLANNING AND ENVIRONMENT COMMITTEE	Subject: BRIEFING NOTE ON TELECOMMUNICATIONS DEVELOPMENT
From: DIRECTOR OF PLANNING AND ENVIRONMENT	
Date: 27 April 2000	Ref: S/PL/30/27/DRM/AB

1. The purpose of this paper is to briefly outline for Members benefit recent events in the development of policy and advice regarding telecommunications apparatus and associated health and safety issues.
2. Members will recall that in June 1999, following concerns expressed both nationally and within the local community, the Council agreed that i) a temporary moratorium be placed on the granting or renewing of leases in respect of telecommunications equipment on Council owned buildings and land, and ii) that all planning applications involving the erection/installation of telecommunications equipment be referred to the Planning and Environment Committee for determination. With respect to the former no new leases have been granted and steps have been taken to commence the removal of apparatus from Council owned buildings, particular schools. With reference to planning applications it should be noted that since June 1999 the Committee has determined 15 applications of which 11 have been refused, largely due to the public perception on health related concerns. In addition to these two decisions the Council agreed to press through COSLA and the Scottish Executive for both greater clarification and guidance on the measures required to ensure that telecommunications apparatus are safe, and to reduce the permitted development rights associated with many of types of apparatus which are currently outwith planning control.
3. In September 1999 the Transport and Environment Committee of the Scottish Parliament sought the Council's views on the Scottish Executive's proposals to introduce new planning procedures for telecommunications procedures. The Council's written submission was made on October 22nd and the Parliamentary Committee thereafter took oral evidence from 20 parties during 4 sessions of the Committee in November and December.
4. On 29th March 2000 the Committee published its report incorporating 35 recommendations to the Scottish Executive. The main issues and points arising from the recommendations were as follows:
 - a) Planning Control: The Committee supported the introduction of full planning control for telecommunications equipment rather than having a system which involves a mix of planning control, prior notification procedure, and permitted development rights.
 - b) Amenity: The Committee recognised that certain actions could be taken to minimise the environmental impact of telecommunications developments, for example site sharing and/or mast sharing. It also felt that while guidance should be developed by the Scottish Executive this was an issue that should be left to the individual planning authorities to determine.
 - c) Health: The Committee recognised that there was currently no conclusive scientific evidence on non thermal effects and the risk to public but the considerable level of public concern on this issue was reflected in the responses to their Inquiry. The Committee recognised the complex issues of public health, including the perceived effects, and recognised the difficulties in securing evidence. Based on the evidence received the Committee considered that there was reasonable doubt about the health risks and recommended that health should be viewed as a material planning consideration and a precautionary approach adopted at a national level, allowing for local flexibility. The Committee considered that areas such as schools, nurseries, hospitals and residential areas may be considered sensitive for environmental health reasons. The Committee recommended that in taking a

precautionary approach local authorities should consider a hierarchy of preferred locations for telecommunications equipment that, where possible, avoid more densely populated areas such as residential areas and be weighted towards more sparsely populated areas e.g. industrial estates. However the Committee did not currently believe that there was sufficient scientific evidence on which to base a recommendation on the implementation of mechanisms such as cordon sanitaire. Finally, the Committee considered that planning applications should be accompanied by a risk assessment report which would be assessed by Environmental Health Departments in consultation with their relevant Health Board.

- d) Policy Guidance: The Committee considered that a national plan incorporating telecommunications development should be developed by the Executive. It also recommended that guidance should be based on a precautionary approach and cover the following matters: health and safety; planning and development control; obligations on and information required from operators; the role and responsibilities of different parts of the Executive; the role and responsibilities of other bodies; monitoring and reporting; and good practice guidance for local planning authorities and telecommunications developers/operators.
 - e) Powers: It should be noted that the licensing of telecommunications operators and health and safety legislations are reserved matters dealt with by Westminster and not the Executive.
5. The Committee's findings have now been presented to the Executive and at present it is not clear when or in what form the Executive will respond. Likewise it should be noted that there is an ongoing inquiry by the Independent Expert Group on Mobile Phones, set up by the Department of Health to assess the current state of research into possible health risks from the use of mobile phones. It is understood that this Group's report is likely to be produced in the very near future. Clearly it is now important that the Executive indicate its intentions and produce guidance to enable both this important industry to progress and for local authorities to respond in a constructive and consistent manner to the issues raised by this ever changing industry.
6. I intend in the near future to produce a formal Committee report detailing the Council's response to the Transport and the Environment Committee's findings so that these can be relayed through C.O.S.L.A.

This Guidance Note provides interim advice based on current information. A number of aspects of the topic are under review, including the planning consent framework. Revised guidance will be issued as and when new information becomes available.

THE ISSUES

There are concerns regarding this topic from a number of viewpoints. From the public perspective the concerns relate to the extent to which radio frequency (RF) emissions from mobile phone base stations (MPBS) pose a health hazard and whether masts should be positioned away from sensitive sites such as schools and nurseries.

The main issues from the scientific view point relate to determining the significance of reported effects on cells, tissues and laboratory animals from very low level mobile phone band RF emissions in experimental situations and assessing the relevance of these effects to human health.

From regulatory and policy stand points the issues relate to determining which guidelines are appropriate for regulating the output of MPBS masts and deciding whether there is a case for applying a "precautionary approach" to the siting of masts.

BACKGROUND

Mobile phone base stations are radio frequency transmitters operating at relatively low power output. The radio frequencies are in the microwave part of the RF spectrum and range from 800 megahertz (Mhz) to 2 gigahertz (Ghz) depending on the precise type of mobile phone technology in use. Newer technologies may use frequencies as high as 60 Ghz. Mobile phone signals have characteristics in terms of the frequencies used, the pulsed nature of the signals and the frequency modulation of the pulse signals which make them different from RF emissions from other sources such as power lines.

The base station transmitters are designed to limit their energy output so as to prevent the public from being exposed to the risk of the heating effect of the RF emissions. However, field strengths in the area immediately surrounding a mast (the "near field") may exceed present guideline limits. Under normal circumstances, the general public would not have very close access to a mast and so would not be exposed to sufficient energy to be at any risk from heating effects. The transmitter antennas are arranged to project the energy beams toward the horizon such that energy emissions directly underneath an aerial array should also be very low.

RF field exposures from base stations beyond the "near field" (i.e. the "far field" which exists more than about 30 cm from the antenna) fall off very rapidly, and by about 10 metres from the antenna are usually orders of magnitude lower than the exposures which can result from using a mobile phone. The power output from a base station is not constant and varies according to the number of separate channels (ranging from 20 to 50) in use at any one point and the power output per channel. The maximum output will occur when all channels are in use simultaneously linking to distant mobile phone handsets.

Factors which influence the amount of RF exposure experienced by an individual include:-

- The power output, frequency and type of RF transmitter.
- The type of antenna and beam direction.
- The distance between a person and the antenna.
- The location of a person relative to the beam.
- The proximity of structures near a person which may reflect signals or shield them from the beam.
- The time spent in the RF field.

HEALTH EFFECTS

Exposure to sufficient RF field energy can result in the heating of cells and tissues. Although operating at higher frequencies than current mobile phone technology in common use, this is the basis of how a microwave oven operates. The majority of known adverse health effects associated with exposure to RF energy (e.g. induction of cataracts) can be attributed to the known heating effects. These are known as "thermal" effects.

There is however, a growing body of scientific evidence which suggests that other effects can occur in cells and tissues following exposure to RF fields, which occur at levels considerably below the intensities normally associated with the known "thermal" effects. These very low level effects are termed "non-thermal" effects. They occur at levels so low that there is not enough energy to increase the temperature of a cell, tissue or organism and yet they appear to generate physical or bio-chemical changes.

The range of non-thermal biological effects include: changes in the flow of calcium ions in cells; increased activity of the enzyme ornithine decarboxylase (ODC) (raised ODC activity has been associated with other factors capable of causing cancer); changes in cell membrane permeability (other than those associated with temperature changes); changes in the permeability of the blood brain barrier (which could be related to the specific RF frequency or the pulse modulation of the RF carrier frequency) and poor performance of laboratory animals in memory based tasks. The mechanisms for these various effects are not clearly understood and their significance to human health is unclear.

There is conflicting evidence regarding the possibility of DNA damage to cells exposed to low level RF emissions. The possibility that DNA damage could occur is a matter of concern given the potential health consequences which could result (e.g. carcinogenesis).

Epidemiological studies to date have focused on evidence associated with exposure to mobile phones rather than the masts themselves and are therefore of limited value. The one consistent finding is an increased risk of having a road traffic accident associated with the use of a cellular phone whilst driving.

Overall the results of clinical and epidemiological studies do not provide a clear pattern of health effects associated with low level RF exposure. Current evidence does not support a definite association between exposure and cancer, reproductive problems, congenital anomalies, epilepsy, headache or suicide. However, the consensus is that these studies themselves are inadequate to rule out the possibility of potential health risks and that much more research is needed.

In conclusion, there is significant scientific uncertainty surrounding the whole issue of the importance of non-thermal, biological effects induced by very low intensity RF fields. This uncertainty and the present inability to rule out the possibility of adverse health effects forms the basis for suggesting the adoption of a strategy based on the "precautionary principle". This principle argues for caution where there are reasonable uncertainties regarding the level of exposure to an agent which could have potential adverse effects. This is consistent with the philosophy of public health protection which advocates prevention of harm in preference to waiting for illness to occur.

LEGISLATIVE POSITION

The current planning consent framework for siting of mobile phone masts is under review by the Scottish Parliament. At present mobile phone base stations come under the category of "permitted development" and do not require planning permission if they are less than 15 meters in height.

The guidelines provided by NRPB on recommended limits for field strengths are advisory only and are not mandatory.

PRINCIPLES OF GOOD PRACTICE

The current UK guidelines on the safe use of mobile phone technology have been developed by the National Radiological Protection Board (NRPB). These are based on NRPB's assessment of existing, conclusive, scientific evidence. This guidance sets standards which, if adhered to, should prevent the risk of being exposed to thermal effects from RF fields. The derivation of guideline limits is complex and a variety of measurement units are used. The favoured unit of measurement relates energy deposition to tissue mass, known as the Specific Absorption Rate (SAR) expressed as watts per kilogram (Wkg^{-1}). NRPB advises restricting RF emissions such that human exposure should be less than 0.4 Wkg^{-1} . As it is not possible to measure SAR in the environment, other parameters are used instead, primarily "power density" expressed as watts per square meter (Wm^{-2}) or field strength, expressed as volts per metre (Vm^{-1}). The SAR limits set by NRPB equate to limiting the power density levels from a base station to 33 Wm^{-2} (or 112 Vm^{-1}) for 900 Mhz emissions and 100 Wm^{-2} (or 194 Vm^{-1}) for 1800 Mhz emissions. The aim of these guidelines is to limit any potential temperature rise in human tissue, following exposure, to less than 0.1°C .

The International Committee on Non-Ionising Radiation Protection (ICNIRP) has also produced guidelines, based on the same data as used by NRPB. The ICNIRP accept that 0.4 Wkg^{-1} is a suitable limit for occupational exposure based on an 8 hour working day. The ICNIRP however also concluded that in order to protect groups who could be more vulnerable to thermal effects, such as children and the elderly, the guideline for the general public should be 0.08 Wkg^{-1} or one fifth of the NRPB limit. The general public were assumed to be potentially exposed for longer

periods and hence to need an additional safety reduction factor built in. NRPB reject the ICNIRP reasoning for a lower limit to protect the general public and insist there is no scientific basis for any further safety reduction factor.

Much of Europe, North America and Australasia have adopted the ICNIRP limits which are stricter than those of NRPB. Italy has recently enacted legislation setting considerably stricter guidance and has also set threshold limits based on the proximity of masts to vulnerable sites including schools, nurseries and hospitals.

A variety of comprehensive reviews of this topic have been undertaken internationally including by The Royal Society of Canada, and the WHO International EMF Project and NRPB. The consistent conclusion of such reviews is that there is insufficiently robust data on low level effects to form the basis for credible safety limits. They maintain that the only valid criteria to base safety limits on are the recognised, accepted and conclusive "thermal effects".

It is generally accepted that energy levels measured in the "far field" will be orders of magnitude below either the NRBP or ICNIRP guideline limits. Studies have found that exposures at ground level near single base stations have generally been in the region of 10 milliwatts per square meter (mWm^{-2}) or less and highest measured exposures have occurred between 30 and 250 meters from the base of a tower. Levels inside apartments with antennas mounted on the outside walls, and in top flats with windows facing antennas at about the same height on adjacent buildings, have been measured as high as 15 Vm^{-1} (600 mWm^{-2}), although such high levels are rare. The measurements at sites where there are multiple co-located antennae will be considerably higher than those from a single installation.

Setting simple distance limits as a means of regulating mast locations is problematic. In densely populated urban areas, a simple distance limit may not be practical. It is more important to ensure that energy levels are minimised (i.e. significantly below current NRPB guidelines) for example by ensuring that masts are high enough to minimise energy levels at points where the beams reach ground level or impinge on surrounding buildings.

Although measured levels are considerably below existing (thermal effect based) guideline thresholds, the levels are in the ranges where non-thermal biological effects could theoretically occur. The case for much stricter guidelines is based on maintaining emission levels below those at which even non-thermal effects may occur. The strictest guideline currently in operation in Western Europe is in Italy, which has set a level of 6 Vm^{-1} (0.1 Wm^{-2}) in urban areas explicitly to take account of non-thermal effects.

There is debate about which aspect of RF emissions is the most significant in terms of non-thermal effects. Measures of power density are considered by some to be less meaningful than measures of field strength. Fluctuations in field strength (Vm^{-1}) may be more important in terms of generating biological effects at the very low energy levels such as those encountered from base stations, whereas power density is likely to be more relevant at the higher energy levels associated with thermal effects.

Levels even lower than the Italian limit of 6 Vm^{-1} are also advocated. A limit of 3 Vm^{-1} has been proposed on the basis that this is current regulation level to which sensitive electronic equipment is built to withstand. Such equipment has to be able to cope with 3 Vm^{-1} without its performance being affected. This is a limit which the industry already has to work to and is therefore a practical and technically achievable target with existing technology.

In essence the debate centres on whether guidelines should be based on the "precautionary principle". This suggests that, given the degree of scientific uncertainty, exposure levels should be set at the absolute minimum to minimise any potential non-thermal adverse effects, rather than being set at the higher threshold level derived on the basis of known thermal effects.

MONITORING

There is no requirement on mobile phone operators to carry out routine monitoring of their masts. There is no systematic monitoring of masts or of ambient levels of RF energy levels in urban areas either by NRPB or any other statutory agency. Some local authorities have carried out ad hoc surveys but are neither required nor specifically resourced to do so. Conventional hand held assessment meters may not be sufficiently sensitive to give an accurate measurement of field strengths and more sophisticated equipment (e.g. a radiofrequency spectrum analyser) may be required, beyond that readily available to most local authorities.

RECENT DEVELOPMENTS

The existing planning system has enabled mobile phone companies to erect masts in sites which could be deemed "sensitive" and against the wishes of local residents. This has in part led to anxiety and concern being expressed particularly where sites are close to schools. Irrespective of the grounds for such concerns, such anxiety and worry could in itself be deemed an adverse health effect consequent upon the mobile phone companies' decisions to use the authority of the planning system to site masts where they chose.

The Department of Health has also set up a review under the chairmanship of Sir William Stewart. The remit of this group is primarily concerned with examining the current evidence and making recommendations on future research, rather than giving advice on the appropriateness of guidelines. The terms of reference of this group are as follows, "To consider present concerns of the possible health effects from the use of mobile phones, base stations and transmitters, to conduct a rigorous assessment of existing research and to give advice based on the present state of knowledge. To make recommendations on further work that should be carried out to improve the basis for sound advice". This committee is expected to report by May 2000.

CONCLUSIONS

Local Authorities and Health Boards have to determine what constitutes a reasonable approach to this issue for their local population.

The case for adopting a "precautionary approach" is persuasive. The basic precautionary principle of maintaining RF emissions at the lowest possible levels, which are technically achievable and practicable, is entirely justifiable from a public health protection standpoint. Adoption of such an approach allows for flexibility in the future to raise thresholds when sufficiently robust scientific evidence of safe levels becomes available. A "precautionary approach" would ensure that in the meantime any risk of potential adverse health effects, no matter how small, is kept to the absolute minimum. This is a fundamentally different approach to using existing scientific knowledge as the basis for setting upper limits, which will only be revised downward on the basis of further conclusive scientific evidence of harmful effects. The approach currently advocated by NRPB may be deemed scientifically rigorous. However, it could not be deemed consistent with the precautionary principle.

There is a reasonable case therefore, for revising current guidelines downwards. As a first step to establishing revised guidelines, the minimum standards in the UK should be made consistent with the recommendations of the ICNIRP, and as recommended by the House of Commons Select Committee on Science and Technology in 1999. Consideration should then be given to establishing guideline levels for the UK which take account of the non-thermal biological effects and which minimise the potential exposure of the general public to RF fields from mobile phone technology. Levels in the order of 3 Vm^{-1} to 6 Vm^{-1} should be considered to achieve this aim.

On the basis of existing information the following are suggestions for action at local level:

- Mobile phone companies should be encouraged to provide monitoring data proving that their installations meet with, at the very minimum, existing guidelines.
- Mobile phone companies should be encouraged to seek the views of local residents regarding the siting of new masts and should be encouraged to show sensitivity to their concerns.
- Mobile phone companies should be encouraged to look for sites which minimise potential exposure of local residents as far as is practically possible and avoid proximity to sensitive sites.
- Mobile phone companies should be encouraged to consider technical options to minimise the need for additional masts, such as mast sharing.
- The siting of existing masts particularly where these are on, or near, sensitive sites should be reviewed and mobile phone companies should be encouraged to find alternative sites where possible. Any existing masts on such sensitive sites should be high enough to ensure minimal energy exposures at ground level.
- Mounting of antennas on building walls should be discouraged where rooms immediately behind such walls will be occupied by people on a regular basis.
- Consideration should be given to developing a monitoring strategy, particularly within city areas, in order to monitor trends over time in the background levels of RF emissions.