

**Parliamentary Commission on Childhood Leukaemia and EMF
from Professor Emeritus M J O'Carroll
comments on draft report 23 June 2007**

Notes as emailed 25-6-07.

I would be happy to have the following notes submitted and considered by the Commission, in parts or whole as late evidence and made available as such.

section 2.2

Perhaps some mention of EF would be helpful before concentrating on MF, rather than launching straight into "EMF levels are measured in Tesla". The Commission's terms refer to Draper, whereas it is not Draper but Ahlbom et al (and Greenland et al) and then IARC which implicate MF.

It is good that the subtle matter of reference levels does not burden this short report. However, it would be advisable to avoid appearing to get it wrong, as "recommended that Government reduce public EMF exposure limits to 100 μ T" might do. Even just the words "in effect" before "reduce" might help. Also it may help to indicate this is for power-frequency MF, since different limits apply for other EMF frequencies.

I suspect that "complements" is intended instead of "compliments"!

section 3.

I am pleased to see recognition of the range of voltages in "30 metres from 132kV, 110kV and 66kV lines". While there are few 66 kV lines, the Northern Ireland system commonly uses 110 kV, which has been too often overlooked in SAGE.

This is only the Exec Summary so perhaps there will be detailed argument later for "The Commission also recommends that the Government consider the case for extending this distance to 200 metres.". Before reading the detailed argument, I would say this looks odd as it seems to abandon distinguishing between 400/275 and 132/110/66 kV lines. Should the extended limits be 200 and 100 metres respectively?

I wonder too, given the problems of practicality, if some provision for exceptions might be made (subject to agreement and compensation), for example where there is just the occasional home near the outer limit of the 200m corridor. Sorry to dabble in content here, it is of course for the Commission to take whatever view it wishes.

It is good to see "Introduce new conditions on licences for electricity transmission and distribution".

Section 4.1

Undergrounding

Where it is said "as much as x times more expensive", perhaps reference might be made specifically to evidence from Europacable to the Beaulieu-Denny inquiry, when x might be from 3 to 7 (if I recall right). But evidence from Ireland suggests a still lower figure at 110 and 132 kV.

It would help to make clear that NG's estimate, and the Beaulieu-Denny evidence, refer only to 400/275 kV, and the figures would be much lower at 132/110/66 kV, making the prospect of undergrounding those lower voltages much more realistic. SAGE lost sight of that point. I hope the Commission will highlight it.

A further point is that, when considering burying all 3000 km of HVOTL, there would be economies of scale for such a large programme, so NG's estimate might be regarded as an upper bound only.

In "moratorium of at 60 metres", perhaps "of at" might better be "up to".

The wording "However, in the light of the evidence in the Draper Report, the Commission feels that a building moratorium at a distance of 200 metres from HVOTL" might possibly suggest only a shallow consideration of this issue. See also my comments on the Exec Summary. Preventing building within 200 metres of existing lines might obstruct political priorities for provision of homes; yet such cases might be solved by undergrounding the existing section of HVOTL, at a favourable cost compared with the loss of land value.

Let me enlarge on that last point. A 1 km section of line with a 200 m corridor either side covers 40 Ha of land. At recent targets of 50 homes/Ha that would provide for 2,000 homes. At £50k per plot with building permission the land would be worth £100 million. Subtracting the land value at agricultural value (say £10k / Ha) would make no material difference. Even at a spacious half-target density of 25 homes/Ha, and without increasing the estimated plot value, the land value would be around £50 million per km of HVOTL. This is far more than the costs of undergrounding, which even at NG's estimate is about £10m per km. So the prospect of "sterilising" a wide corridor of land might reasonably be dismissed. Undergrounding would be better and cheaper; better because there would be other contingent benefits such as reduced visual impact on the houses, plus the increase of land available for building even on the former pylon sites.

Incidentally, any concern about MF from underground cables can be

dismissed by deeper burial. The MF field figures given by NG are for typical shallow burial in trenches of 1.5 metre trench depth, with cables at about 1 metre depth.

Therefore it may be worth saying in the report, that such an extended corridor (200m) need not involve widespread "sterilising" of land from home-building, but instead it would involve burying existing lines, which would be better and cheaper.

Turning back now to the 60m corridor, would the idea of a moratorium also, in practice, tend to result in burial of the line instead of a sterilised corridor? At the above housing densities, the value of making land available for building homes would be 60/200 of the above figures for the 200m corridor. That is £30 million per km instead of £100 million. At half-target density, it would still be £15 million per km and hence still well worth the alternative of burying the powerlines.

Taking stock of the above:

1. cost of +/-60 m loss of home-building land: c. £15M / km.
2. cost of burial (400 kV, NG estimate): c. £10M / km.
3. burial achieves 200m protection and more.

This only applies to land for building homes, not to agricultural land. SAGE took estimates for the whole HVOTL network of 3,000 km based on existing housing density, which is low because much of the land near those 3,000 km of lines is not building land.

An important consequence, for government housing policy, is that new building land might be recovered from land near existing powerlines. Where that land is presently not built on, but could be used for medium to high density housing, the gains in land value would seem to outweigh the costs of undergrounding. Where the land is partly built on, the remaining gains would be lower.

On the other hand, it could be argued that the gains should be compared with the gains otherwise obtainable from building near the existing HVOTL. Then account should be taken of lost space near pylons and of devaluation, on a comparable basis with our estimates above. With devaluation in the region of 10 or 20 % of the final selling price of the home, and home values around £200k, the losses of building near HVOTL, compared with a buried line, would be in the region of say £25-50k per plot. That almost wipes out the gains of land value, estimated above as £50k per plot, when recovering land for building.

Taking stock again (UGC = underground cables):

1. value of +/-60 m land for home-building near UGC: c. £15M / km.
2. loss due to building near HVOTL: £7.5-15M / km
3. net gain for building near HVOTL: £0-7.5M / km.

4. cost of burial (400 kV, NG estimate): c. £10M / km.

Clearly, these are very approximate estimates. Any estimates will depend on fairly gross approximations, although these are on a consistent basis.

What this is telling us is that the difference, in overall value, between building near HVOTL and building near UGC, is of the order of the cost of undergrounding. Therefore, even if land near an existing HVOTL is already developed, the gain in land value by undergrounding the line so as to increase housing and property value might reasonably justify the undergrounding. If the land is not built on (nor designated for building), the gain in value by recovering land for building would easily outweigh the cost of undergrounding. If the neighbouring land were to remain agricultural after undergrounding, these comparisons would not apply and there would not be a gain (from land values in an agricultural corridor) to justify the undergrounding.

The above is based entirely on land values and not on potential health benefits. The potential health benefits would be a bonus.

This is something SAGE failed to see or properly discuss. SAGE dismissed undergrounding at an early stage, as too expensive compared with other options. Then SAGE explored what at first appeared a cheap option (the moratorium), of just restricting new developments. Then that option was costed on the basis of lost development, and this was estimated as a high cost. However, if land recovered by (deep) burying powerlines were to be used for medium to high density housing, there would be a gain much greater than the cost of burial.

A possible rider to Recommendation 1:

There is evidence to suggest that the better way of implementing the moratorium would be to bury parts of existing and new lines, so that "sterilised" corridors around overhead lines are not created. This would appear economic for both new and existing lines in areas of medium to high housing density, by virtue of the value gained in land for housing development and in existing property value. There may be special high value in recovering land near existing overhead powerlines, by deep-burying the lines, for new housing development, especially where this accords with the government's policy for improving housing supply.

section 4.2

The claim "no biological mechanism to explain the association has yet been identified" needs clarification, as in ordinary language it could be misleading. The situation is this. Biological mechanisms (at molecular, cellular and systemic levels) have indeed been identified,

which could possibly form at least parts of mechanistic pathways, by which the association could be shown to be causal, although experimental evidence is often (but not entirely) at higher exposure levels (milliTesla rather than microTesla) than in residential exposures.

The words "no biological mechanism" carry a powerful "spin" that there is no mechanism known at all, or in other words that any cause is completely unsupported speculation.

So much hangs also on the words "to explain"; in this claim they would mean "to give a full and convincing explanation of one or more whole mechanistic chains by which the exposure would give rise to the observed outcome". That is asking a lot. What we have is a wide range of mechanistic evidence giving rational grounds for suspicion of causation, though an uncertain suspicion, but not (yet) accepted by the authorities as establishing cause.

Section 4.4

Perhaps "Ordnance Survey Digital Mapping" should be "Ordnance Survey Digital Mapping". However, I feel that the OS maps may be out of date in respect of several powerlines. It would be helpful to have a check with power companies' plans (e.g. the NG Seven Year Statement) and with DTI records of applications for new lines.

Section 5

Where the draft says "The Commission recognises that several changes to existing legislation would be needed to institute a building moratorium", discussion in SAGE was on the basis that legislation per se, as distinct from planning guidance and consent practice, might not be required.

Section 5.1

Where the draft asserts "EIA regulations do not contain any requirement to consider public health issues", it may be worth noting that the underlying EU legislation, Directive 97/11/EC, in Art 3 requires EIAs to "identify, describe and assess ... the direct and indirect effects of a project on ... human beings". Further, Annex IV para 1 requires the description to include "an estimate ... of expected residues and emissions (... , light, heat, radiation, etc.) ...", which might reasonably be taken to include EMFs.

Section 5.2

The costs of a moratorium approach are, correctly, identified from SAGE as twofold: compensation for loss of development value and devaluation

of existing housing near powerlines.

The above arguments however would lead to some reduction in these estimates. The devaluation component is least certain, and would still apply as a blanket effect. However, where development potential near existing lines would at first sight appear to be lost as a result of a moratorium, in many cases it may be feasible to bury the line instead. Then there would be a gain in development potential and in property value. The gainers (the property developers and existing nearby home owners) may need to pay a contribution to the electricity company to bury the line, although the electricity company may also pay a contribution commensurate with avoided compensation. This would tend to show an overall gain where there is medium to high density housing near the line.

As a result of the way of working of SAGE, these possibilities were not addressed. Instead, work proceeded straight to an editorial process of drafting a report before cost-benefit analysis was fully or widely discussed.

In practice it is possible, and even likely, that the effect of a moratorium would lead to more undergrounding in development areas and hence to some gains in development value, which would at least partly offset the estimated costs.

On benefits, where the draft says: "The only information the Commission is aware of on the public's willingness to pay is the UK-wide quantitative survey commissioned by CHILDREN with LEUKAEMIA on EMF and health", the Commission might be made aware of other evidence.

For example, Professor Emeritus Lewis Roberts (UEA) has reported in the RSA Journal of the case with radon and the public's unwillingness to pay a moderate sum (around £1,000 if I recall) for practical measures to remove exposures. In that case it should be recognised that the exposure is one which families in the area had lived with for generations, which point might have affected willingness-to-pay (WTP).

However, there will be other sources cited in the Treasury document or elsewhere which suggest that public WTP in general is limited. I suspect that in the case of burying powerlines, WTP will also be affected by aesthetics and visual impact, and by the involuntary imposition of artificial EMF in contrast to the long-standing natural exposures to radon, so that WTP would be higher for EMF than for more general uncertain hazards. While there has been research on risk perception, it may be that this has not yet carried through to a better understanding of the variability of WTP.

Section 5.3

If I may raise what is purely a political point here, it seems that the obstacle to protecting public health from potential harm is chiefly the compensation which would be paid to property developers for potential losses in speculative development. Is that a proper political balance, public health versus property speculation? Is there a way in which compensation in respect of speculation could be avoided or prohibited? Would it be reasonable for such speculative losses (that is, failure to make hoped-for gains) to be taken as part of the business risk of property speculation?

There is also the risk that property speculators will be incentivised to take the compensation, if it is high enough, and to block undergrounding even when that would be more viable overall.

That's all! I have simply gone through the whole Commission draft from start to finish. Sorry if that has resulted in some repetition and rambling on.