

Introduction: The Connecticut Siting Council requested that their EMF consultant, Gradient Corporation, provide comments on the draft compromise agreement, regarding possible adoption of the “California model” in lieu of exposure levels as the basis of the EMF BMP. The CSC also requested that Gradient review Attorney Blumenthal’s comments regarding the 2007 draft EMF BMP agreement.

Gradient’s comments on the 2007 revised BMP draft

Gradient’s review of the scientific component of the revised CSC BMP document (2/1/07) finds it to be generally reasonable and appropriate, except perhaps on page 3, in the middle, where a sentence asserts that ICNIRP “established a MF exposure guideline of 833 mG, based on known adverse effects of high field exposures.” This statement sounds more alarming than is warranted by the science, particularly since this sentence is followed by another, higher safety guideline at 9,040 mG. For power-line fields, even very high levels have not been found to have frank adverse health effects, because the only established biological effect is “magnetophosphenes,” which are field-induced flickering light sensations in the peripheral visual field, and which occur at 60-Hz magnetic field levels of about 50,000 mG. That is, the guidelines are based on avoiding stimulation of neurons, which is a transient physiological effect not known to have either short-term adverse health effects (except unwanted or interfering sensations) or any long-term adverse health effects. Perhaps an improved sentence would be:

ICNIRP “established a MF exposure guideline of 833 mG based on avoiding potential stimulation of neurons that may occur with high magnetic-fields.”

The policy component of the revised CSC BMP is also clear and reasonable in that the CSC, in the absence of any established EMF health risks, adopts a precautionary cost guideline (4% of project costs for EMF mitigation) rather than choosing a position that may lead to arguing fruitlessly about which magnetic-field guideline level to adopt. Furthermore, the prioritization of these monies for mitigation near schools and day care centers is appropriate, because such expenditures help address areas where public concern may be focused.

It appears that the main, and significant, strength of the 2/1/07 compromise draft BMP over the 9/28/06 draft BMP is that an emphasis on specific, numerical magnetic field screening guidelines as “safe” is avoided, being replaced by a precautionary “as low as reasonably achievable” given modest (roughly 4% of project costs) expenditures that lower fields by at least 15% without endangering any other aspects of transmission line safety and reliability.

Nonetheless, it remains clear that the original, Sept. 28, 2006, draft BMP, which gave a screening magnetic field level of 100 mG, was scientifically reasonable, if specific numerical magnetic field screening guidelines are to be endorsed. That is, the CSC 9/28/06 draft proposal of 100 mG was precautionary and protective, and well within the range of other health protective guidelines:

International Committee on Electromagnetic Safety	9,040 mG
Australian Radiation Protection and Nuclear Safety Agency (draft guideline)	1,000 mG.
International Commission on Non-Ionizing Radiation Protection	833 mG
Florida Environmental Regulation Commission	150 – 250 mG
New York Public Service Commission	200 mG
Connecticut Siting Council, 9/28/2006 Draft BMP Guideline	100 mG
Massachusetts Energy Facilities Siting Council	85 mG

When viewed within this array of magnetic-field guideline levels, the CSC's proposed 100 mG is seen as precautionary and protective. Moreover, the scientific analysis in the 9/28/06 BMP, based on an uncertainty extrapolation of data from long-term animal exposures to fields up to 20,000 mG showing no evidence of cancer risk, provides additional justification for the 100 mG screening guideline.

Gradient's review of the AG Feb. 9 comments on the 2007 revised BMP draft

The AG's comments on the "Joint Filing of Proposed Revised Best Management Practices" tend to significantly muddy the waters. That is, the major strength of the 2007 revised draft BMP is the focus on the "4%-of-project-costs" guideline, without extensive arguments regarding "good" or "bad" levels of EMF. Unfortunately, the AG's comments not only bring back into debate the issue of "safe levels" of power-line magnetic fields, but they also propose that mitigation should not be limited to "no cost" and "low cost" measures.

The comments begin by asserting that "The scientific evidence still demonstrates a link between EMF and childhood leukemia." This statement is both alarmist and scientifically inaccurate. The 2007 draft BMP gives a valid summary of the evidence: "Some epidemiology studies have reported an association, while others have not." and "The absence of animal data supporting carcinogenicity makes it biologically less likely that magnetic field exposures in humans, at home or at work, are linked to increased cancer risk." A balanced view of all lines of evidence does not support a "demonstrated link."

The comments go on to say that "protective steps should not be limited to 'no cost' or 'low cost' measures. All reasonable mitigation measures should be available for consideration to protect public health and safety" – "when the health and safety of children is at stake." Incorporating such language into the BMP will likely lead to protracted arguments about what "reasonable" means, and how much progress toward "health and safety of children" will be achieved by any given "mitigation measure."

The AG's comments propose that transmission line design "mitigate EMF from the start." This sounds reasonable, but has the potential to lead to confusion. That is, such language would leave open the question of the level of resources (4% ?) should be committed to "mitigating EMF from the start." The comments then go on to state that the "Council should specifically require applicants to utilize all no cost EMF mitigation measures available." Such language would seem to preclude any consideration of whether a specific no-cost EMF mitigation measure has other, non-EMF, adverse consequences, such as increased risk for utility linemen, decreased reliability, increased ecological impact, increased costs of maintenance, and so forth.

Finally, the AG's comments appear to advocate that a "10 mG screening level" be written into the BMP, which again raises anew the debate as to the scientific basis of such a level, at what location will "compliance" be determined, whether this is for peak levels or some sort of time-average, and what if other sources of power-line magnetic fields already exist at the location that exceed this level, and so on.

In summary, the emphasis in the AG's comments on "uncertainty as to whether the application of a 4% benchmark in Connecticut will reduce EMFs to levels that are considered safe," appears to move in the direction of re-igniting what may well be a fruitless debate on how to determine what is considered "safe." Such an emphasis on absolute safety, asserted in the absence of any appreciation of how putative "EMF risk" compares to established threats to a child's health and safety, cannot be recommended as a reasonable approach to the CSC's BMP.

Additional Note on Amtrak's Electrified Railroad in Connecticut

Perhaps the CSC or AG's office has commented on EMF from the electrification of the Amtrak Northeast Corridor, but the CSC may well be aware of the EMF measurements that have been made for currently operating electric trains traveling the Northeast Corridor in Connecticut, and associated electric transmission facilities. These EMF results are reported in the 2006 Department of Transportation report:

"EMF Monitoring on Amtrak's Northeast Corridor: Post-Electrification Measurements and Analysis" report of the Federal Railroad Administration. DOT/FRA/RDV-06/01, 2006.

A copy of the report is available at the website:

<http://www.fra.dot.gov/downloads/RRdev/rdv0601.pdf>

These FRA data show elevated 60-Hz EMF levels in the proximity of the electrified track, around substations supplying the track, and onboard the train, in the passenger compartments. The report abstract states:

ABSTRACT: "Background EMF levels increased by 1-2 orders of magnitude after rail electrification, but are well below limits in all applicable human exposure safety standards."

Around some substations, *e.g.*, the Branford, CT, substation average 60-Hz fields are reported as 245 mG and peak fields are reported as 3,560 mG. 60-Hz fields are also elevated when the trains pass under road bridges, *e.g.*, approximately 100 mG on overpasses above the train, and 60 to 80 mG at trackside. Onboard, in the passenger compartment, electric-train passengers experience 60-Hz magnetic fields averaging about 15 mG and reaching peaks of about 120 mG. Thus, from the perspective point of view, it is important to keep in mind these existing fields, to which the public is exposed in Connecticut.

As the CSC formulates policies for the EMF mitigation required for utility transmission-line rights of way, some consideration should be given to these existing levels of EMF associated with operation of electrified rail transport in the Northeast Corridor. The EMF guideline used by the Federal Railway Administration in this document on EMF in the Northeast Corridor is the International Committee on Electrical Safety, IEEE guideline for the general public (IEEE C95.6 MPE), of 9,040 mG.