

## Knoxville Chapter

### Tennessee Society of Professional Engineers

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**NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS**  
**MILTON F. LUNCH ETHICS CONTEST**

**Facts:**

A developer retains a contractor to design and build a residential subdivision near several high-voltage power lines. Engineer A, an electrical engineer employed by the contractor, recommends to the contractor and developer to include a protective steel mesh in the homes to be built to mitigate occupants' exposure to interior levels of low-frequency electromagnetic fields (EMF). While Engineer A understands that in the United States there are no widely-accepted health and safety standards limiting occupational or residential exposure to 60-Hz EMF, he is aware of and concerned about certain scientific research concerning possible causal links between childhood leukemia and exposure to low-frequency EMF from power lines. Because of the added costs associated with the recommendation, the developer refuses to approve the recommendation. Contractor directs Engineer A to proceed in accordance with the developer's decision.

**Question:**

What are Engineer A's ethical obligations under the circumstances?

**References:**

- Section I.1 - NSPE Code of Ethics: Engineers, in the fulfillment of their professional duties, shall hold paramount the safety, health, and welfare of the public.*
- Section II.1.b - NSPE Code of Ethics: Engineers shall approve only those engineering documents that are in conformity with applicable standards.*
- Section II.4 - NSPE Code of Ethics: Engineers shall act for each employer or client as faithful agents or trustees.*

**Discussion:**

The facts of this case are in many ways a classic ethical dilemma faced by many engineers in their professional lives - reconciling the competing values of improved safety or quality versus lower cost in a design, including instances when the engineers are asked by the employer or client to sign off on documents in which they may have reservations or concerns.

The Board of Ethical Review has examined this issue over the years in differing contexts. In BER Case 61-10, it held that engineers assigned to the redesign of a commercial product of lower quality should not question the company's business decision but had an obligation to point at any safety hazards in the new design. In BER Case 65-12, the Board dealt with a situation in which a group of engineers believe that a product was unsafe and determined that as long as they held to that view, they were adequately justified in refusing to participate in the processing or production of the product in question, while recognizing such action would likely lead to loss of employment. In BER Case 84-4, the Board determined that an engineer, whose design had been rejected by the client and who had concerns that the client's requested re-design could endanger the public, still had to turn over his plans to the client. In BER Case 92-4, the Board determined an engineer employed by a public agency could not issue a construction permit for a project whose environmental controls he judged inadequate, despite his supervisor's contrary opinion.

In BER Case 94-4, the Board determined that a forensic engineer could not defy a Court Order, in his testimony about an industrial accident, by citing a European safety standard requiring a safety guard not required by US standards.

The present case, because there is no controlling (or even widely-accepted) US Standard for 60-Hz EMF radiation for residential exposure, more closely resembles BER Cases 61-10 and 94-4 than BER Cases 65-12 and 92-4. Engineer A has concerns about possible health effects of residential exposure to 60 Hz EMF. They may prove prescient, but they may be dispelled too. He cannot justify his additional design by a relevant US building standard or even by widespread practice. Clearly, it would add to the cost of the homes.

While it was appropriate for Engineer A, given his knowledge of this controversial topic, to make the additional design recommendation, the developer has rejected it as too costly. Since there is an insufficient objective basis for Engineer A to claim the additional design is necessary to protect public health and safety, he should accept the developer's direction and complete his project.

**Conclusion:**

Under the circumstances, it was ethically permissible for Engineer A to recommend the protective steel mesh. Since there is no widely-accepted, let alone controlling, standard for 60-Hz EMF radiation in US, the developer was justified in rejecting it. Engineer A is ethically obligated to comply with the developer's direction and complete the design.