

Biological effects of overhead electric transmission lines: a technical or a social issue?

by Scott A. Smith

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Scott A. Smith is an Environmental Analyst with the Siting and Environmental Section of the City Public Service Board of San Antonio in San Antonio, Texas.

This controversial issue first became a reality at the City Public Service Board at a time when easements were being obtained for the construction of the 345,000 volt transmission line running from the South Texas Nuclear Project to San Antonio. In fact, the very first project I was asked to conduct at CPS was an inquiry into the environmental effects of overhead transmission lines. I was just out of graduate school, I was accustomed to spending long hours in libraries, analyzing tremendous amounts of written material. In retrospect, it's a good thing that I was asked to become involved in this project when I first came to CPS. Today I don't think I could devote the amount of energy necessary to dissect and inject such a voluminous and contradictory topic.

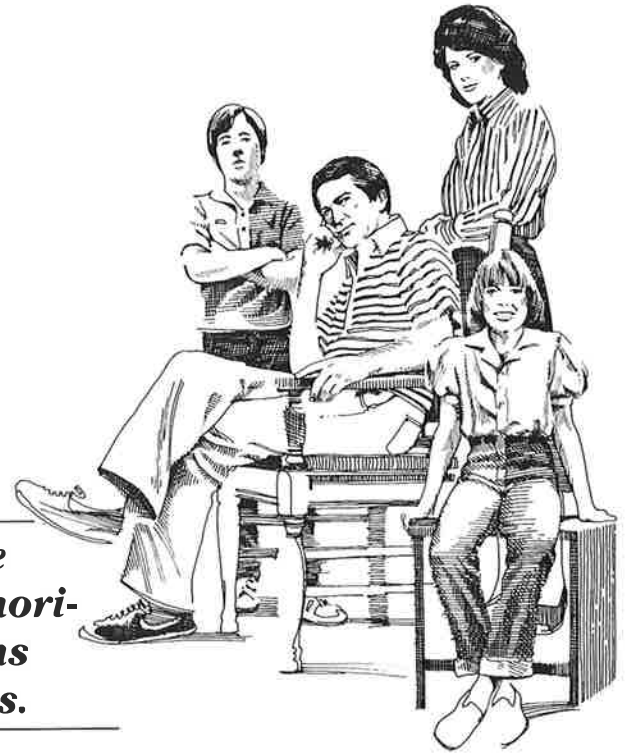
As an environmental analyst at CPS, I am paid to make subjective recommendations based upon the available literature. I have three file cabinets in my office stuffed with studies concerning the scientific aspects of the biological effects topic. It is a highly complex, multidisciplinary field of study. Chemistry, engineering, biology, physics, meteorol-

ogy, and geology are just some of the disciplines sharing the spotlight. Considering the staggering amount of time and effort that has been consumed in trying to quantify the alleged effects of OH transmission lines, it is truly remarkable that the answer to the question of effects remains as elusive and enigmatic as ever. The vast majority of the research conducted in this field unquestionably vindicates transmission lines from being the nasty characters as alleged. Also, should a study ever be initiated to quantify the benefits of the high voltage transmission of electricity as opposed to the environmental costs, I am confident that the results would weight overwhelmingly in favor of the continued utility of the lines.

So why all the fuss? Why do we see such a disparity within the scientific community when pondering the effects question? Part of the fault for this can be pointed at the scientific method itself. The scientific method of reason and logic works well in most cases of research, but encounters uncertainty when faced with having to prove the negative, that is, that there is no effect. Obviously, having to prove that something, anything, can or will not happen, is likely to be a difficult proposition at best. However, some research has indicated that biological effects do indeed

occur as the result of transmission lines. The supposition that biological effects do occur is hardly a surprise. The problem arises from the interpretation of these effects, that is, do they pose a hazard? Complicating the matter further is the fact that the effects seen in the laboratory are manifested in experimental animals, not humans, and the fact that the effects discovered are ever so subtle. It is for these reasons that research being conducted by such organizations as S.W. Research and Dr. Rogers has attracted the scrutiny of scientists everywhere. However, with all due respect to these efforts, I do not believe that we shall ever see a single definitive study resolve this issue. It shall remain controversial and open to personal interpretation for a long time to come.

The beginnings of this issue may have rooted originally in the laboratory in a purely academic fashion. But, the real catalyst that ensures its longevity is purely emotional in nature. Let me be more precise. The question of environmental effects from O.H. transmission lines really flexes its muscle in a court of law, and originates as a shout of protest from the landowner whose property is earmarked for a power line. The environmental effects question at this point becomes a tool, a point of leverage for the landowner and his legal advisors.



I recently came across a very interesting article that related an incident in Minnesota involving the routing of a 400,000 volt direct current transmission line through two-thirds of that state and two-thirds of North Dakota. The article described in gory details the struggle between two electric cooperatives exercising their right of eminent domain and the property owners to be affected by the line. The best screen writers in Hollywood could not have concocted a more representative case study than what occurred in Minnesota between August of 1973 and today.

The idea was to build a power plant in North Dakota, then transmit the electricity via the 400 KV dc line back to the distribution area of the two cooperatives involved, that area being the suburbs of Minneapolis-St. Paul. Upon discovery of the proposed line and its route, the landowners, primarily farmers, took their concerns to their respective county governments. The reason for this is because many Minnesota counties have zoning powers over cooperatives. Simply stated, the farmers wanted the counties to zone the lines off of their properties. In all, eight county governments became involved.

The cooperatives chose at that point to request the State to have the Minnesota Environmental Quality Board (MEQB) route the power line. The request was accepted in April of 1975. The effect of this landmark action was to remove local power from the decision making process, frustrate and anger the landowners involved and severely hamper their input into the siting of the line. One year later, the line had been routed by the MEQB over the objections of the farmers. These objections included:

1. The use of eminent domain by the cooperatives to take over private land.
2. The financial compensation due them for the land.
3. The loss of prime farmland for the project.
4. Preemption of county authority by the state.
5. The fear that power from the project would benefit metropolitan areas and not farms.
6. The lack of notice to landowners from the cooperatives, the state and the county.

7. The biological effects from these lines on their crops, farm machinery, animals, and families.


I called Sheldon Mains, the author of the article describing the events leading up to and following the routing of the Minnesota line. Mains was a key figure in the routing of the line and works for the Minnesota Environmental Quality Board. I asked Mains what the most important concern of the farmers was at this point. He concluded that, without a doubt, the farmers were primarily opposed to the "confiscation" of their property by the authorities, period. To Mains, the biological effect concerns developed coincidentally to property rights.

In addition to routing the line, the MEQB ordered the cooperatives to construct the line a minimum of 50 feet rather than 35 feet over agricultural land and to monitor ozone levels. They also asked the Minnesota Department of Health to conduct an inquiry into the health and safety effects of ac and dc lines.


A few months later, four counties in Minnesota filed a five million dollar damage suit against various Minnesota agencies, state officials, and the cooperatives. The suits were consolidated by the Minnesota Supreme Court, who appointed a special panel of three District Court judges to hear the case. On July 14, 1977, the panel ruled unanimously in favor of the State and the cooperatives. Particularly frustrating to the farmers was the decision by the panel that the preemption of county authority by the State was legal.

Meanwhile, surveyors were encountering opposition from farmers in the field. So much so that they requested protection by the National Guard.

As I read more about violent opposition to the construction of the line, I began to wonder about the inhabitants of this area of Minnesota. Looking into the census statistics for that area, I found it to be largely agrarian in nature (as expected). But the history on the four county areas in question was much more interesting. It seems that this is the birthplace of the Populist movement



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