

[*Translation*]

**Mr. Marc Ferland (Portneuf):** Mr. Speaker, today we have a motion before the House suggesting that it would be useful to study the effects of electro-magnetic fields created by high voltage power lines on humans and animals, and to report the findings to the House.

Electric power has been in common use for about a hundred years, and its presence has become increasingly widespread and indeed essential.

For more than ten years, public concern has been growing about the possible effects of electro-magnetic fields created by high voltage power lines. I may add that all electrical appliances, both at home and at work, create electro-magnetic fields. We are constantly exposed to these fields. High voltage power lines are only one source of electro-magnetic fields, and if we are concerned about high voltage power lines, we should be concerned about all electrical appliances.

Unlike X-rays, electro-magnetic fields are very low energy. They are incapable of modifying intercellular connections or even of producing heat like microwaves do.

So far, many studies on the effects of these fields on animal cells and human health have been made, both nationally and internationally. On the whole, cell studies have indicated that electro-magnetic fields can produce biological effects whose significance is not clear but which are not thought to be very serious. Some of these effects may cause cancer, although no specific mechanism has been identified to explain the cause and effect link satisfactorily.

There is an interesting hypothesis that has found favour among the scientific community. Today, Mr. Speaker, we know that cancers are created by cancer causing substances, in several stages. There are at least two: the first stage is the induction of the tumour and the second stage is its promotion. At the induction stage, cancer-causing substances can produce a malignant and irreversible change in the genetic systems of several cells. The change may be limited to only a few cells, and be overlooked and remain stable for a long time, even forever. However, at a given time, one may be exposed to certain promoter substances that could cause these malignant cells to multiply. This is the promotion stage of the tumour, when the cancer's presence can be

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detected. Some substances only act as inducers, other substances only act as promoters, while some substances do both. It is thought that electro-magnetic fields might be promoters of malignant tumours.

There are no valid data on studies with animals, which is unfortunate, since animal testing has been a unique way to provide scientific evidence when investigating a substance that is suspected of causing cancer.

Perhaps I should also mention that some animal experiments have shown well documented effects on the daily circadian rhythms and behaviour of animals.

Studies on humans have concentrated on the health of exposed workers and on children living near high voltage power lines.

In the studies on workers, various occupations were investigated such as electricians, electrical engineers, linemen, power station operators and workers in aluminium plants. Some of these studies show that certain types of cancer increased: leukaemias, brain tumours and melanomas. Leukaemias, however, showed a more consistent increase than other tumours.

Studies of exposed workers were recently reviewed.

In some analyses, the results of all the studies were combined and together they showed a slightly increased risk of leukaemia. Many unknowns prevent identifying the cause of this increase in cancer: workers' actual exposure to electro-magnetic fields is not known because valid dosimetry is lacking; that is, in the group of exposed workers, there might be some highly exposed individuals and some almost unexposed. But it is impossible to know whether or not the increase of cancer lies in the highly exposed workers' environment. This increase could be due to chemicals that are also present in the workplace.

The results of studies on those living near high voltage lines, more specifically, on children, are not unanimous. Some studies show no increase of cancer in children and others show a slight increase. Many methodological problems have been identified which might easily compromise the validity of the results of these studies.

The most recent study done in the United States, in 1987, is considered much more valid than all the previous studies because it corrected the errors of the past. It is based on a population of children exposed in their homes