My name is Campbell McLaren, E.R. M.D. and I (would like to) submit the following comments and recommendations to the S.E.C. to be included as rules to safeguard the people of N.H from the dangers of ELF/EMF fields.

The recommendations of the SB-99 Health & Safety work group were ignored.

This is contrary to the intent of SB-((. We know who was responsible for this, but do not seek public disclosure at this time. However, from here (on) forward we do not request, but demand, that we be heard and that our recommendations are seriously considered and incorporated and that the committee's final rules reflect N.H> RSA 162.11:16 IV (e)

We are at an (extremely) crucial time in N.H.'s history. (Neither Federal nor State?) Standards for transmission line (setbacks?) have (not) been set and we may face in the future a significant increase in transmission line development.

To explain the issues briefly:

When current flows down a line, ELF/EMF fields are generated. Occurs with A/C lines and minimally with D/C lines

(Explain ELF & EMF plus measurement units)

The voltage of the line is not the most relevant factor, but lead is, and even township (taps and) transmission lines of 67Kv can generate large EMFs. Angles in lines particularly increase the magnetic field.

The EMF drops off as it distances itself from the transmission line. 300 ft. from the center of transmission line the miligauss is back to normal.

(N.B. ELF/EMF is absorbed by the body like blotting paper and cannot be shielded against. Tho burying the line with modern techniques significantly lowers the EMF.

Health Risks. Since 1979 there has been much research and hundreds of papers on EMF and health hazards.

(note that in 1986 the SEC evaluated the safety issues of a transmission line from Canada thro. VT and then NH.)

In 1992. The Rapid Study—strongest evidence for health risks, child. Leuk.

IARD ------- Pooled studies, 2-B carcinogen, two-fold increase in leuk. in children living in an environment of 3-4 milligauss.

E.P.A.

W.H.O

Draper --- 70% increase in risk of leukemia. ,200m. (634') 29,000 children. The strongest evidence for risk is the doubling of the incidence of leukemia in children --- causation not proven but a strong suspicion of connection. Many other medical problems perhaps. Lymphoma in line workers and miscarriage having the strongest correlation with EMF

Because of strong suspicion of leukemia associated with EMF in children- many countries and several U.S. States have invoked the precautionary principle of prudent avoidance strategies.

(Describe the Precautionary Principle or Prudent Avoidance)

e.g. for ongoing review, etc.

Remember it took many years to prove causation with cigarettes, DDT, asbestos, Agent Orange, etc.

MITIGATION STRATEGIES

1. Increase tower height. Need more ROW
2. Oppositional phasing of the current with adjacent lines.
3. Measurement of m.gauss at edge of ROW

Knowing that children growing up in an oscillating field of 3-4 m.gauss may/will get leukemia.

Describe: Mass/ Florida/ N. York/ Conn./Wisconsin

3. Further, with the Conn. Best Practices being an excellent example of Rule making and standards.

In their document they require the applicant to provide the location of and anticipated EMF levels encompassing residential areas, private and public schools, licensed child-care facilities, licensed youth camps and public playgrounds within 300' of a proposed transmission line.

They also include buffer zones and limits on EMF.

Other states and their guidelines are included in this document.

Many countries have mandated buffers and emphasize distancing of schools.

Burying lines would be the ultimate protective strategy.

To conclude, I request the SEC hire a politically neutral Electrical Engineer (or engineers) to evaluate the EMF risks to the people of N.H. and to help the SEC develop standards.

"The SEC shall take into consideration the surrounding environment at the time the existing rights of way were given in relation to the surrounding environment at present. For example, what was forest and farm land when easements were given or taken by eminent domain for rural electrification (1920s to 1950s) there are now residential neighborhoods."

Causation has not been proven: but numerous studies have shown an association and statistically significant increase in the development of leukemia in children living in an environment of more than 3-4 M.Gauss.

Because of the lack of strong scientific evidence—many countries and states have adopted the precautionary principle and/or prudent avoidance policy

"The Precautionary Principle, European Commission 2000:

Where action is deemed necessary, measures based on the precautionary principle should be:

- *Proportional* to the chosen level of protection
- *Non-discriminatory* in their application

- *Consistent* with similar measures already taken
- *Based on an examination of the potential benefits and costs* of action of lack of action (including, where appropriate and feasible, an economic cost/benefit analysis.)
- *Subject of review*, in the light of new scientific data and
- *Capable of assigning responsibility for producing the scientific evidence* necessary for a more comprehensive risk assessment."

"Precautionary approaches, such as the Precautionary Principle, address additional uncertainties as to possible but unproven adverse health effects. Such risk management policies provide an opportunity to take incremental steps with respect to emerging issues. They should include cost-benefit considerations and should be seen as an addition to, and not as a substitute for science-based approaches in assisting decision-makers to develop public policy."

Prudent avoidance: Whereby even without any demonstrable risk the most achievable low-cost measures will be taken to reduce E.M.F. exposure.

SEC Presentation based on the annotated draft final proposal

Referencing chapter site 300 certificates of site and facility.

To be added to 301.03 (g) (9) : *Provide all assumptions used to model magnetic field levels including:*

-Pole design diagram that includes the dimensions of pole arms, dimensions of conductor locations, horizontal distance from the pole to the conductors, and the distance of conductors from the ground at the pole.

-Height of lowest conductor(s) at mid-span.

-Depth from ground surface to circuits, for underground construction

To be added to 301.03 (h) (6): *Information regarding the cumulative impacts on human health, constantly evaluated and assessed by attention to (in accordance with?) evolving scientific evidence.*

To be added to 301.08 (b) (1) For Electric Transmission Facilities:

a. The number and type of each building or area within the following distance categories- as estimated from the edge of the ROW: 0-25 feet, 26-50 feet, 51-100 feet, and 151-300 feet. Types of building include homes, apartments, schools, daycare centers, hospitals, commercial/industrial buildings and playgrounds.

b. Detailed magnetic field profiles for each unique structure type or circuit configuration (new and existing) M.R. profiles to be measured from the ROW centerline out to a distance of 300 feet on each side of the centerline, at intervals of 25 feet, including at the edge of the ROW at one meter above ground level.

c. For routes that would affect existing electric lines, provide magnetic field profiles for the existing lines and a post-construction scenario that incorporates the new and the existing lines.

d. For routes that would have multiple adjacent underground circuits, provide magnetic fiels profiles for each set of circuit configurations.

e. Estimated magnetic field data which include:

1. estimate for proposed lines at 80 percent and at 100 percent of peak load for one year post-construction and 10 years post construction. For existing lines, use present day loadings to estimate the magnetic field levels.

2. provide expected current levels for 80 and 100 percent of peak load at one and ten years post-construction.

To be added to 301.08 (c) (5):

Suggested mitigations may include but not be limited to

(a) increase distance between the transmission line and the public's exposure to the magnetic Fields

(b) bring lines closer together (magnetic fields interfere with one another, producing a lower overall magnetic field level, too close could cause arcing between the lines.)

(c) bury transmission lines to reduce magnetic fields. (Underground lines can be installed closer together and insulated with rubber, plastic or oil)

Different States have ? setback mG levels at the edge of the ROW in order to mitigate public health and safety impacts.

Exhibit B:

Massachusetts:

The Commonwealth of Massachusetts has defined an edge-of-ROW level of 85 mG as a benchmark for comparing different design alternatives. Although a ROW-edge level in excess of this value is not prohibited, it may trigger a more extensive review of alternatives.

New York

New York has a policy that required transmission lines to be designed, constructed and operated

so that magnetic fields at the edges of the ROW will not exceed 200 mG.

Florida

Florida limits magnetic fields at the edge of the ROW to 150 mG for transmission lines with voltages of 69 kV through 230 kV. For lines greater than 250 kV, the limit is 200 mG. Double circuited 500 kV lines and lines greater than 500 kB may not exceed 250 mG, also at the edge of the ROW.

Wisconsin.

Until the mid-2000s Wisconsin followed a policy of prudent avoidance. Under the policy, the Public Service Commission, which holds full jurisdiction over transmission siting, could mandate changes to the transmission line route based on mG levels at nearby residences. Today the PSC typically responds to concerns raised by abutters under a hardship finding.