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3. I request that the following transmission recommendations regarding health and welfare, from the pre-rulesmaking SB-99 workgroups submission, be incorporated in the final rules.

“4. Key Findings - Transmission Setbacks

Magnetic fields are created from the flow of current through wires or electrical devices. As the current increases, so does the strength of the magnetic field as measured in units of milligauss (mG). The magnetic field level at 300 feet or more from a transmission line centerline should be similar to local ambient, or background levels.

There are no known causal links between power-line magnetic field (MF) exposure and demonstrated health effects, in particular with regard to some forms of childhood cancers. However, some studies show a weak association. Since science cannot prove a negative, magnetic fields cannot be proven to be entirely safe. At the same time, science has been unable to prove the positive either. It's for this reason that the debate persists.

The State of New Hampshire does not have specific rules regarding EMF levels at the edge of transmission rights-of-way (ROW) nor are there federal standards for limiting transmission line EMF. Other states, however, have tackled this issue beginning in the 1980's and 90's at a time when utilities were undertaking substantial power line build-out. Several states enforce firm limits on EMF while others have adopted siting constraints and/or reporting rules around EMF levels. A policy of 'Prudent Avoidance' crops up frequently in the literature. Under this policy, state agencies seek a reasonable balance between avoiding potential harm to humans and the associated costs and risks.

See Appendix C.4 for a review of how different states are treating this matter when siting high voltage (HV) transmission lines.

The topic of safety setbacks for HV transmission lines was the most contentious within the Health/Safety work group. Several participants held firm that human exposure to electromagnetic fields (EMF) emanating from HV power lines is a concern, particularly for children, while others insisted that numerous studies have repeatedly demonstrated that EMF is not a public health risk. The dispute within the group was representative of the broader debate nationwide where, after more than three decades of research, concerns still remain (5) .

4.2. Areas Without Agreement It is difficult to assess the level of agreement on this topic but some in the group at least agreed that the SEC consider requiring applicants to provide pre- construction and estimated post-construction EMF readings as part of the application process. In addition, there was some agreement that the number and types of buildings at specific distance categories be included in the application.

4.3. Alternative Proposals for Areas Without Agreement Since the extent of agreement on this topic is uncertain, proposed rules are listed in Table 4.a. An alternative is to take no action relative to EMF.

Table 4.a TRANSMISSION LINE SAFETY (EMF) - Application requirements

1. The number and type of each building within the following distance categories – as estimated from the centerline: 0-25 feet, 26-50 feet, 51-100 feet, 101-150 feet, and 151-300 feet. Types of buildings include homes, apartments, schools, daycare centers, hospitals, and commercial/ industrial buildings.

2. Detailed magnetic field profiles for each unique structure type or circuit configuration (new and existing) with the exception of dead-end structures adjacent to substations. 3. 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.

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

5. Estimated magnetic field data which includes:

- ☐ 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 fields levels.

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

6. 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.

7. The Application shall propose and implement where practicable, low-cost efforts to reduce EMF Without compromising safety. Suggested mitigations may include but not be limited to:

- ☐ increase distance between the transmission line and the public's exposure to the magnetic fields;

- ☐ Increase height of transmission structures which would lower resulting exposure levels;

- ☐ 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);

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

TRANSMISSION LINE SAFETY (EMF) - Application requirements (6)

1. The number and type of each building within the following distance categories – as estimated from the centerline: 0-25 feet, 26-50 feet, 51-100 feet, 101-150 feet, and 151-300 feet. Types of buildings include homes, apartments, schools, daycare centers, hospitals, and commercial/ industrial buildings.

2. Detailed magnetic field profiles for each unique structure type or circuit configuration (new and existing) with the exception of dead-end structures adjacent to substations.

3. 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.

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

(5) California Department of Health Services and the Public Health Institute, Electric and Magnetic Fields retrieved at <http://www.ehib.org/emf/longfactsheet.PDF>

(6) Application rules derived from the State of Wisconsin PSC requirements. The State of Wisconsin has not established any limits on EMF levels or setback distances.

"4 Background information on Transmission Siting and EMF

Different states have taken different approaches regarding EMF when siting large transmission projects. The following paragraphs briefly detail how some address EMF exposure when siting lines greater than 69kV (16)

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 requires 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 kV may not exceed 250 mG, also at the edge of the ROW.

Wisconsin

Wisconsin has not set hard limits on EMF levels but the state has taken the position that the public has a right to know details about EMF levels. The application process requires project proponents to provide the following information:

a) number and type of each building within the following distance categories – as estimated

from the centerline: 0-25 feet, 26-50 feet, 51-100 feet, 101-150 feet, and 151-300 feet. Types of buildings include homes, apartments, schools, daycare centers, hospitals, and commercial/ industrial buildings.

b) detailed magnetic field profiles for each unique structure type or circuit configuration (new and existing) with the exception of dead-end structures adjacent to substations.

(16.) It's important to note that EMF is directly tied to the amount of current flowing through a line. Lower capacity lines (69 kV) can show high levels of EMF while some 115kV lines may have lower levels of EMF."

Appendix C.4 provides a brief summary of the rules adopted by other states on the topic of HV transmission siting and EMF. In addition to the EMF discussion, additional information was provided to the group covering the following transmission setback concerns:

- FERC recommendations (7) on setbacks for new transmission to the outside of the ROW.
- HUD guidelines (8) precluding buildings from being constructed within the "engineered" fall distance of a high voltage tower. HUD is tightening its lending and is requiring verification that the building is not within this fall distance.

7 <http://www.nh.gov/oep/energy/programs/documents/sb99-setbacks-transmission-ferc.pdf>

8 <http://www.hud.gov/offices/adm/hudclips/handbooks/hsg/4150.2/41502c2HSGH.doc>