

STATE OF IOWA
DEPARTMENT OF COMMERCE
UTILITIES BOARD

IN RE: CEDAR FALLS UTILITIES	DOCKET NO. E-21647
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PROPOSED DECISION AND ORDER GRANTING FRANCHISE

(Issued July 6, 2005)

APPEARANCES:

MR. IVAN T. WEBBER, attorney at law, Ahlers & Cooney, P.C., 100 Court Avenue, Suite 600, Des Moines, Iowa 50309, and MR. TROY M. DEJOODE, attorney at law, Cedar Falls Utilities, Utility Parkway, P.O. Box 769, Cedar Falls, Iowa 50613, appearing on behalf of Cedar Falls Utilities.

MR. JOHN F. DWYER, attorney at law, Office of Consumer Advocate, 310 Maple Street, Des Moines, Iowa 50319, appearing on behalf of the Iowa Department of Justice, Office of Consumer Advocate.

MR. BERT and MRS. DIANE SCHOU, P.O. Box 249, Cedar Falls, Iowa 50613, appearing pro se.

STATEMENT OF THE CASE

On May 27, 2004, Cedar Falls Utilities (Cedar Falls) filed a petition with the Utilities Board (Board) requesting a franchise to erect, maintain, and operate a 161 kilovolt (kV) (169 kV maximum) electric transmission line approximately 2.5 miles long proposed to be constructed in Black Hawk County, Iowa. Cedar Falls filed an amendment to the petition on June 4, 2004.

As proposed, the transmission line would originate at Cedar Falls' Union Substation within the city limits of Cedar Falls, Iowa. It would run south within the city, then exit the city limits and run approximately one and one-half miles south along Union Road, then turn and run east along Ridgeway Avenue for approximately one mile, then re-enter the city limits and terminate at a new Industrial Park Substation to be built within the city of Cedar Falls. (Petition Exs. A and B; Hockmuth Report.) The Board does not have jurisdiction over the parts of the line within the city limits. Iowa Code § 478.1 (2005). The portion of the proposed transmission line outside the city limits is approximately 2.5 miles long. That is the portion of the line for which Cedar Falls is seeking a franchise from the Board.

Cedar Falls is not seeking eminent domain authority in this case. Iowa Code § 478.6.

Cedar Falls held an informational meeting regarding the proposed transmission line on August 12, 2003. (Petition Ex. G; Hockmuth Report; docket file.) Two written objections to the proposed line were filed with the Board. (written objections.) Ms. Lorraine Joens (Ms. Joens) filed a written objection on September 2, 2003. Mr. Bert and Mrs. Diane Schou (the Schous) filed a written objection on September 2, 2003. The Schous filed additional information regarding their objection with attachments on October 29, December 8, and December 22, 2003.

On December 23, 2004, the Board issued an order assigning this case to the undersigned administrative law judge. The Board found that the hearing should be held in Waterloo, Iowa, pursuant to Iowa Code § 478.6. On January 11, 2005, the

undersigned issued a procedural order and notice of hearing and proposed to take official notice of a November 23, 2004, report concerning the proposed transmission line by Mr. Dennis Hockmuth, Utility Regulatory Engineer for the Board.

Cedar Falls filed prepared direct testimony and exhibits of Mr. Curtis S. Johnson and a brief and memorandum of law on January 31, 2005. It filed prepared rebuttal testimony of Mr. Johnson, Dr. John W. Lamont, and Dr. Brian Paul Sires on April 6, 2005.

The Schous filed letters and exhibits with the Board on February 18, February 22, March 22, and March 29, 2005.

The hearing was held on April 15, 2005, beginning at 10:30 a.m., in Tama Hall, Room 108, Hawkeye Community College, 1501 E. Orange Road, Waterloo, Iowa. Cedar Falls was represented by its attorneys Mr. Webber and Mr. DeJooode. Mr. Johnson, Dr. Lamont, and Dr. Sires testified on behalf of Cedar Falls. Cedar Falls' Exs. 1, 2, 3, 4, 5, 6, 7, and 8 were admitted at the hearing. The Consumer Advocate Division of the Department of Justice (Consumer Advocate) was represented by its attorney Mr. Dwyer. Ms. Joens was present at the hearing and was unrepresented by counsel. Ms. Joens did not testify at the hearing. The Schous were present at the hearing and were unrepresented by counsel. Mr. Schou testified on his own behalf. Mrs. Schou did not testify at the hearing. The Schous' Exs. DS-201, DS-202, DS-203, DS-212, DS-213, DS-214, DS-215, DS-216a, DS-216b, DS-216c, DS-216d, DS-217, DS-218, and DS-219 were admitted at the hearing. Mr. Hockmuth testified as the engineer selected by the Board to examine the proposed route pursuant to Iowa

Code § 478.4. The parties and the Schous did not object to the taking of official notice of Mr. Hockmuth's report dated November 23, 2004 (Hockmuth Report), and it was officially noticed.

Cedar Falls did not cause notice of the filing of the petition to be published prior to the hearing. Therefore, pursuant to Iowa Code § 478.5 and 199 IAC 11.5(2), Cedar Falls caused notice of the filing of the petition to be published in Black Hawk County in the Waterloo-Cedar Falls Courier, a newspaper of general circulation in the county, on May 16 and May 27, 2005. (proof of publication.) Cedar Falls filed its proof of publication of notice on May 31, 2005. (proof of publication.) Persons have 20 days from the date of the second publication to file written objections with the Board. Iowa Code § 478.5. The objections filed by Ms. Joens and the Schous listed above were the only objections filed in this case.

NEED FOR THE PROPOSED LINE

In order to obtain a franchise, Cedar Falls must prove that the proposed transmission line is necessary to serve a public use. Iowa Code § 478.4.

Transmission of electricity for distribution to the public is "a public use" within the meaning of the statute. S.E. Iowa Cooperative Electric Association v. Iowa Utilities Board, 633 N.W.2d 814, 820 (Iowa 2001) (S.E. Iowa); Vittetoe v. Iowa Southern Utilities Company, 123 N.W.2d 878, 880 (Iowa 1963). Therefore, one issue in this case is whether the proposed transmission line is "necessary" to serve that public use. Iowa Code § 478.4; S.E. Iowa at 820.

Exhibit D of Cedar Falls' petition describes the purpose of the proposed line.

Cedar Falls states that:

Cedar Falls Utilities proposes to build a 161,000 volt transmission line, 2½ miles of which would be built outside of the city limits of Cedar Falls. This new line is necessary to serve a public use and will connect the existing Union Substation in the western part of Cedar Falls (terminus 1) to a new substation in the Industrial Park in the southern part of Cedar Falls (terminus 2). The entire project also includes a new section of 161,000 volt transmission line from the new Industrial Park Substation to MidAmerican Energy's Deere Engine Substation, all within the city limits of Cedar Falls and Waterloo.

One purpose of this project is to provide a high voltage source to the new substation which is being built to serve the growing load in the Cedar Falls Industrial and Technology Parks. The load in the Industrial and Technology Parks is now served out of one existing substation at the north edge of the parks. The new substation, at the south edge of the parks, will support present and future economic development in the area by providing adequate transformer capacity to serve the area with the inherent reliability associated with a second location served by a different transmission source.

The second purpose of this proposed line is to complete a 161,000 volt transmission line loop around the west and south sides of the Waterloo/Cedar Falls metropolitan area as recommended by comprehensive electric system planning done over the past twenty-five years. Completing the loop will enhance the reliability of the transmission system for all electric customers in the Black Hawk County metro area. MidAmerican Energy supports this project and is working with Cedar Falls Utilities on the interconnection agreement and facilities.

As opposed to some areas in Iowa, Cedar Falls continues to grow. Over 100 homes per year have been built in Cedar Falls in the past several years and recent examples of growth in the Industrial and Technology Parks include the new Target Distribution Center, the relocation of Hamilton

College and Performance Bodies to the Industrial Park, and expansions of existing businesses such as Team Technologies and The Mudd Group. We expect jobs and population growth to continue for at least several years to come.

The new 161 KV line, as proposed, fits well into the existing electric utility system and does not parallel existing utility routes. The completed loop will eliminate a potential weakness in the area transmission system and thus relieves the need for other power system construction planned for the near future. CFU staff studied the possible use of alternative routes and methods of supply, but determined that because of the fixed end points and the land available for the new substation, the route chosen would impact the fewest members of the public at the lowest cost to CFU customers. Further, since the line will be built totally in public road right of way outside of the city limits, and mostly within the public road right of way within the city limits, all in areas zoned agricultural and light industrial, CFU believes that the project is consistent with present and future land use and zoning, and will not inconvenience or cause undue injury to any of the adjacent property owners.

(Petition Ex. D.) (emphasis in the original)

Demand for electricity in Cedar Falls and in the Industrial Park is growing.

(Tr. 41, 52; Petition Ex. D; Hockmuth Report, p. 4) The proposed line would connect an existing Union Substation to a new Industrial Park Substation, thus providing a high-voltage source of electricity to the new substation to serve the growing power needs in the area. (Hockmuth Report, p. 4; Tr. 40-41; Petition Ex. D.) The load in the Industrial and Technology Parks is currently served by one existing substation at the north end of the parks. (Petition Ex D; Tr. 40) The new substation would be located at the south end of the parks and would be served by a different transmission source, which would improve reliability of electricity to the parks. (Petition Ex. D; Tr.

40, 56-62.) The new substation would also support present and future economic development in the area by providing adequate transformer capacity to serve the area. (Tr. 40.)

The Cedar Falls and MidAmerican Energy transmission systems in Waterloo are interconnected at several points. (Tr. 39.) This allows the two utilities to share their transport of energy around the Cedar Falls-Waterloo metro area. (Tr. 39.) Construction of the proposed line would complete a 161-kV transmission loop around the Cedar Falls-Waterloo metro area and provide an additional source of 161-kV transmission to the Union Substation. (Tr. 39, 58-62; Hockmuth Report, p. 4; Petition Ex. D) This would enhance the reliability of the electric system for all customers in the metropolitan area. (Hockmuth Report, p. 4; Tr. 39-40, 56-62; Petition Ex. D) It would also reduce the need to run the Cedar Falls power plant, which is more expensive to run than Cedar Falls' other sources of power. (Tr. 57.)

The Schous questioned whether there is a need for the proposed line. (Tr. 172-175; March 22, 2005, letter, p. 1; March 29, 2005, letter, p. 1; Ex. DS-214.) In support of their position, they state that Cedar Falls has not grown as projected in the 1978 Black & Veatch Study of Iowa Public Service Company Interties with Cedar Falls Utilities (1978 Study). (March 22, 2005, letter, p. 1; March 29, 2005, letter, p. 1; Ex. DS-214; Tr. 172-175.)

Mr. Johnson, manager of engineering services for Cedar Falls and an electrical engineer, testified on behalf of Cedar Falls. (Ex. 1; Tr. 33, 38.) Mr. Johnson testified that annual load growth has been less than projected in the 1978

Study, but testified that is why the line was not built shortly after 1988 as recommended in the 1978 Study, and is instead being proposed now. (Tr. 52.) Mr. Johnson's explanation is reasonable and is consistent with other evidence presented.

Other than the Schous' challenge of the growth projection in the 1978 Study, the evidence supporting the need for the proposed line is uncontested. (Petition Exhibit D; Hockmuth Report; Tr. 39-42, 52, 56-62.) Cedar Falls presented sufficient, persuasive evidence that demonstrates the proposed transmission line is necessary to serve a public use. (Petition Exhibit D; Hockmuth Report; Tr. 39-42, 52, 56-62.)

RELATIONSHIP TO OVERALL PLAN OF TRANSMITTING ELECTRICITY IN THE PUBLIC INTEREST

To obtain a franchise, Cedar Falls must prove that the proposed transmission line is reasonably related to an overall plan of transmitting electricity in the public interest. Iowa Code §§ 478.3(2), 478.4.

In its petition, a utility company seeking a franchise must include information showing the relationship of the proposed project to economic development, comprehensive electric utility planning, present and future needs of the public, existing electric utility system and parallel routes, other power systems planned for the future, possible alternative routes and methods of supply, present and future land use and zoning, and inconvenience or undue injury to property owners. Iowa Code § 478.3(2). Cedar Falls provided this information in its petition, and the information provided supports a finding that the proposed transmission line represents a

reasonable relationship to an overall plan of transmitting electricity in the public interest. Iowa Code § 478.3(2). (Petition Exs. B, D; Hockmuth Report.)

As discussed above, the transmission systems of Cedar Falls and MidAmerican Energy are interconnected in the Cedar Falls-Waterloo metropolitan area, and the proposed line is needed to serve a growing demand for electricity in Cedar Falls and the Industrial Park and to enhance the reliability of the system in the Industrial and Technology Parks and in the entire metropolitan area. (Petition Ex. D; Hockmuth Report, p. 4; Tr. 39-42, 52, 56-60.) The proposed line fits into the existing electric utility system and the entire project will complete a 161 kV loop around Cedar Falls-Waterloo. (Tr. 39-42, 58-60; Petition Ex. D; Hockmuth Report, p. 4) The completion of the loop is the result of comprehensive planning taken place over the last twenty-five years. (Tr. 40, 52; Petition Ex D; Ex. DS-214.) Cedar Falls considered a number of methods of supply and alternate routes, which will be discussed below, but decided that the proposed route would impact the fewest members of the public at the lowest cost to its customers. (Tr. 41-47; Exs. 2-4; Petition Ex. D; Hockmuth Report.) The proposed route does not parallel existing utility routes. (Tr. 41.) Cedar Falls proposes to build the section of the line outside of the city limits entirely in public road right-of-way in areas zoned agricultural and light industrial. (Tr. 41, 47; Hockmuth Report p. 4.) All poles will be set parallel to and within the right-of-way. (Tr. 47; Hockmuth Report, p. 3.) The field-side insulators and conductors will overhang private property by less than five feet, for which Cedar Falls

has obtained 20-foot voluntary overhang easements from all adjacent property owners, including Ms. Joens, one of the objectors. (Tr. 47; Hockmuth Report p. 3.)

Cedar Falls' witness Mr. Johnson testified the proposed line would not inconvenience or cause undue injury to any of the adjacent property owners. (Tr. 41, 62-63.) The objectors dispute this. (objections and letters filed; Tr. 156-165, 170, 175-195, 197-200; Exs. DS-201 through DS-203, DS-212 through DS-219.) This issue will be discussed below.

Considering all the evidence presented, the undersigned finds that Cedar Falls has presented sufficient persuasive evidence that shows that the proposed transmission line represents a reasonable relationship to an overall plan of transmitting electricity in the public interest. (petition for franchise; Exs. 2-8; Hockmuth Report; objections and letters filed; Tr. 39-65, 156-165, 170, 175-195, 197-200; Exs. DS-201-03, DS-212-19.)

CONSTRUCTION AND SAFETY REQUIREMENTS

In order to obtain a franchise, Cedar Falls must show that the proposed transmission line will conform to the construction and safety requirements of Iowa Code §§ 478.19 and 478.20 and the Utilities Board rules at 199 IAC 11 and 25.

The plans and specifications for construction of the proposed line require compliance with the National Electrical Safety Code (NESC) requirements and Board rules. (Tr. 47-48.) The design of the proposed facilities is consistent with the NESC and other safety provisions adopted by the Board. (Tr. 48, 63-64; Hockmuth Report,

p. 3; petition for franchise.) Cedar Falls will operate and maintain the proposed line in conformance with all safety requirements. (Tr. 48.)

The proposed transmission line is designed using single wooden poles, 65 to 95 feet tall, with an average spacing of 265 feet and a maximum span of 312 feet. (Hockmuth Report, p. 3; petition for franchise; Tr. 47.) The proposed transmission line would have a single-phase 7.2 kV distribution line underbuild constructed on the same set of poles as the proposed transmission line. (Hockmuth Report, p. 3; Petition Exs. A, C2.) The distribution line would be at least 18.5 feet above the ground. (Hockmuth Report, p. 3; Petition Ex. C2.) As designed, there would be no transmission guys and anchors, but there may be some distribution guys. (Tr. 47.) Cedar Falls witness Mr. Johnson testified the utility would negotiate the location of the distribution guys with property owners at a later date. (Tr. 47.)

Cedar Falls has shown that the proposed line will conform to the construction and safety requirements in Iowa Code §§ 478.19 and 478.20 and 199 IAC Chapters 11 and 25. (Petition for franchise; Hockmuth Report, p. 3; Tr. 47-48, 63-64.) No terms, conditions, or restrictions regarding construction and safety requirements need to be imposed pursuant to Iowa Code § 478.4.

ELECTRIC AND MAGNETIC FIELDS

Electric and magnetic fields are generated by the operation of alternating current power lines and are sometimes referred to as EMF. (Tr. 48, 54, 103.) The fields themselves can be thought of as lines of force in space around a power line. (Tr. 48.) The electric field is caused by the voltage, which is generally constant or nearly constant. (Tr. 113.) The current in the power line produces the magnetic field. (Tr. 48, 103, 114.) The electrical field spreads out away from the line, and the field decreases as a square of the distance. (Tr. 103.) Electric and magnetic fields can be measured. (Tr. 48.) The standard unit of measurement for electric fields is volts per meter. (Tr. 48.) The standard unit of measurement for magnetic fields is milligauss (mG). (Tr. 48, 103.) The normal ambient background level in the environment is about 2 mG. (Tr. 103.)

There have been studies to assess the potential health effects of electric and magnetic fields by the National Institute of Environmental Health Sciences (NIEHS), National Academy of Sciences, International Agency for Research on Cancer, National Radiological Protection Board of Great Britain and the Health Council of the Netherlands. (Tr. 48-49.) There is some epidemiological association of magnetic fields at high exposure levels with childhood leukemia, although no experimental causal link has been found. (Tr. 49.) Cedar Falls' witness Mr. Johnson, an electrical engineer and manager of engineering services for Cedar Falls, testified there is not any reliable scientific evidence that connects electric and magnetic fields with any other adverse health effects. (Tr. 49, 73-74; Ex. 1.) He testified that the issue has

been studied very thoroughly over the last twenty-five years and no one has found conclusive evidence that there is a health concern. (Tr. 74.)

The only states with standards that regulate magnetic field levels are New York and Florida. (Tr. 49.) New York has a limit of 200 mG and Florida has a limit of 150 mG for magnetic field levels at the edge of the right-of-way. (Tr. 49.) There are no federal standards. (Tr. 49.)

Cedar Falls calculated electric and magnetic field level exposures that would be expected from the proposed transmission line. (Tr. 49.) The initial calculations showed that along the south edge of the right-of-way, the magnetic field exposure would be between 3 and 4 mG. (Tr. 49.)

Two of the objectors, the Schous, own property that is across the road to the south from the proposed transmission line. (Tr. 48, 55; Exs. 2, 4; Schou objection and letters filed.) The proposed line would not be located on the Schous' property. (Tr. 48; Ex. 2.) The proposed transmission line would be approximately 97 feet north of the Schous' northern property line. (Tr. 48; Exs. 2, 4.) The proposed line would be approximately 400 feet from the Schous' house and approximately 250 feet from their office. (Tr. 48.) The other objector, Ms. Joens, owns property immediately to the north of the proposed line. (Tr. 48; Exs. 2, 4.) Ms. Joens' house is between 50 and 100 feet north of the proposed line. (Tr. 48.)

Further initial calculations by Cedar Falls showed that the magnetic exposure to cars driving on the road next to the proposed line would be between 3 and 4 mG.

(Tr. 49-50.) Cedar Falls initially calculated that the magnetic exposure at the Schous' house and office would be between zero and 0.3 mG. (Tr. 49.)

Cedar Falls later calculated the magnetic and electric field levels of the proposed line using various scenarios. (Tr. 50-51; Exs. 5-8.) To make the calculations, Cedar Falls took actual field measurements near its existing line of the same size and configuration as the proposed line and ran computer models. (Tr. 54, 71-73.)

The proposed line would ordinarily carry 33 megawatts (MW) at peak load conditions. (Tr. 50.) At 27.9 MW, the magnetic field exposure along the road would be 5.837 mG. (Tr. 50; Ex. 5.) Magnetic field exposure at the Schous' house would be 0.065 mG and would be 0.165 mG at the Schous' office. (Tr. 50, 54; Ex. 5.) Magnetic field exposure at Mrs. Joen's house would be 2.365 mG. (Tr. 50; Ex. 5.)

At 55.8 MW, approximately double the peak load expected on the line, magnetic field exposure along the road would be 11.674 mG, at the Schous' house 0.130 mG, at the Schous' office 0.329 mG, and at Mrs. Joen's house, would be 4.731 mG. (Tr. 50; Ex. 6.) At 125 MW, which is greater than the entire load of Cedar Falls, magnetic field exposure along the road would be 26.268 mG, at the Schous' house 0.293 mG, at the Schous' office 0.741 mG, and at Mrs. Joen's house, would be 10.644 mG. (Tr. 50-51; Ex. 7.) Even at 255 MW, the thermal load limit of the wires, which is the maximum electricity that could be passed through the wires without destroying them, magnetic field exposures would be 53.411 mG at the road, 0.596

mG at the Schous' house, 1.506 mG at the Schous' office, and 21.643 mG at Mrs. Joen's house. (Tr. 51; Ex. 8.)

Cedar Falls' witness Mr. Johnson testified that the fields generated by the proposed transmission line would not cause health or other adverse consequences. (Tr. 51, 74.) He testified that the World Health Organization has not classified EMF as a carcinogen and few studies have identified any possible adverse health effects from exposure to electric lines. (Tr. 54.) He testified that burying the line would not eliminate the EMF. (Tr. 53.) He testified there is no demonstrable scientific evidence of harm. (Tr. 55.)

The proposed transmission line would be constructed on the north side of Ridgeway Avenue, across the street from the Schous' house and business. (Tr. 55; Ex. 2.) There is currently a distribution power line serving the Schous' house and business that is on the south side of Ridgeway Avenue, and this line would be removed when the new line is built. (Tr. 55.) Cedar Falls designed the proposed line using a triangular configuration to reduce the magnetic field emanating from the line. (Tr. 200-201.)

Dr. Sires, a board-certified neurologist, testified on behalf of Cedar Falls. (Tr. 88-97.) Dr. Sires testified that he is not aware of any specific neurologic syndrome associated with exposure to electromagnetic fields. (Tr. 89.) He testified that, although he occasionally hears that complaint, it is commonly in association with psychiatric, rather than neurologic illness. (Tr. 89.) He further testified there has been a good deal of investigation into whether or not neurologic illness can come

from electromagnetic or other application of field strength to human or other species, but none of them have born fruit. (Tr. 89.) In his opinion, there is not an organic neurologic dysfunction that comes from exposure to electromagnetic fields. (Tr. 89.)

Dr. Sires testified that injuries from electric lines are caused by direct contact with the lines. (Tr. 89-90.) He testified direct grounding of a high voltage wire will cause transmission of electricity through the person making the grounding and will destroy tissue. (Tr. 90.) This is different than simple exposure to an electromagnetic field. (Tr. 90.) Dr. Sires testified that the effects of exposure to an electromagnetic field are benign, with one caveat. (Tr. 90.) He testified there is some experimentation with very high field strength directly over the brain, magneto encephalography, but he is not aware that it causes any deleterious effects. (Tr. 90.) He is not aware that electromagnetic field exposures cause headaches, fatigue, nausea, or other nonspecific symptoms. (Tr. 89-90.) He testified that electromagnetic fields dissipate rapidly, depending on distance from the high voltage wire, and become negligible within a relatively short distance. (Tr. 90.) Dr. Sires testified that there has never been a study that demonstrated that power lines such as the one proposed in this case have any connection with organic disease such as tumors or cancer. (Tr. 92-95.) He testified there is no evidence that power lines of this type create any organic disease in humans. (Tr. 93, 95.)

Dr. Lamont, professor of electrical and computer engineering at Iowa State University, testified on behalf of Cedar Falls. (Tr. 98-143.) Dr. Lamont has conducted studies regarding the health effects of electromagnetic fields generated by

electrical transmission. (Tr. 101-06.) He testified there is more exposure to electromagnetic fields in the home and work place than from power lines. (Tr. 104, 106-07, 118.) He also testified that fluorescent lights use about a quarter of the power of incandescent lights, and the magnetic field would be proportionally lower. (Tr. 107.) Dr. Lamont measured the milligauss level in the hearing room at one point during the hearing, and it jumped between .1 and .2 mG. (Tr. 131.)

Dr. Lamont testified there is not any direct evidence of adverse health impacts from exposure to electronic magnetic fields generated by power lines. (Tr. 104, 129.) He testified that there are some statistical epidemiological studies that show a very weak relationship between some forms of cancer and living within 50 meters of transmission lines or substations, but the studies have not been followed with an examination of related problems such as economic status and quality of health care. (Tr. 104, 129-130.) He testified the correlation is not strong enough to base a case of causation. (Tr. 104.)

Dr. Lamont testified that the only adverse health effect associated with electric fields is the risk of shock to employees who are not sufficiently grounded when they have contact with a line. (Tr. 138-41.) He testified the electric field levels associated with the proposed line as shown in Exs. 5-8 would meet all state requirements by a significant margin, and there would be no public health issue with regard to the electric fields from the proposed line. (Tr. 140-41.)

Dr. Lamont has conducted studies of the effects of electric transmission lines, and these studies have found no evidence of adverse impacts from electric transmission lines on sheep, corn, and soybeans. (Tr. 105-06.)

Dr. Lamont testified that burying power lines would increase magnetic field exposure, because burying the line does not stop the field from forming. (Tr. 106, 108-09.) Burying the line puts the field in the ground rather than the air and because the line is not buried as far from the surface of the ground as it would be in the air on poles, the most intense parts of the field are nearer to people. (Tr. 106.)

Dr. Lamont testified that electric fields are relatively easy to shield using something as simple as screen wire. (Tr. 109.) He testified that magnetic fields are much harder to shield. (Tr. 109.) He testified mu metal will provide shielding but it is extremely expensive and easily loses its shielding properties if anything is done to it, such as bending or dropping it. (Tr. 110.) He testified there is nothing that is cost or technically effective that could be used to shield a residence or work area. (Tr. 110.) He further testified that it would not be physically possible to shield a power line such as the one proposed by Cedar Falls. (Tr. 111.)

Dr. Lamont testified that increasing the distance from the line is one way to reduce the magnetic field exposure. (Tr. 111-12.) In general, if the distance from the line is doubled, the magnetic field exposure is one-fourth as much. (Tr. 133.) Putting the conductors in a triangular shape as opposed to flat construction will also reduce exposure. (Tr. 112.)

Although the objectors raised questions with respect to the health effects of the proposed lines, they presented no evidence regarding electric or magnetic field levels of the proposed line and no persuasive evidence that showed there would be any adverse health effect from the electric and magnetic fields of the proposed line at issue in this case. (Joens objection; Schou objection and letters filed (including appendices A-D); Tr. 94-97, 122-131, 156-165, 169-200; Exs. DS-201-03, DS-212-19.) The Schous' evidence is discussed below. Cedar Falls has presented sufficient proof that it designed the proposed line to reduce magnetic field levels and that the electric and magnetic field levels that will be produced at the edge of the right-of-way of the proposed line, along Ridgeway Avenue, and at the homes and business of the objectors, will not be harmful to the public health and safety. (Tr. 48-51, 53-55, 73-75, 88-97, 101-143, 200-201; Exs. 2, 4, 5-8.) No additional terms, conditions, or restrictions related to electric and magnetic field levels need to be imposed pursuant to Iowa Code § 478.4.

LINE LOCATION AND ROUTE

The Board has the authority to impose modifications of the location and route of the proposed line that are just and proper. Iowa Code § 478.4. Iowa Code § 478.18 requires transmission lines to be constructed near and parallel to roads and railroads and along division lines of land wherever practical and reasonable. The same section requires the utility to construct the line so as not to interfere with the

use by the public of the highways or streams of the state and so as not to unnecessarily interfere with the use of any lands by the occupant.

Cedar Falls' proposed route begins at the Union Substation, goes straight south along Union Road for about three miles within city limits, then continues south for another 1.5 miles outside city limits to the north side of Ridgeway Avenue. (Petition Exs. A, B; Tr. 43; Hockmuth Report, pp. 4-5; Exs. 2, 4.) It then turns east and runs along the north side of Ridgeway Avenue for one mile, re-enters the city limits, and continues another 1.3 miles along Ridgeway Avenue within city limits to the new Industrial Park Substation. (Petition Exs. A, B; Tr. 43; Hockmuth Report, pp. 4-5; Exs. 2, 4.) Cedar Falls is only seeking a franchise from the Board for the 2.5-mile section of the route outside of the city limits. (Hockmuth Report, p. 5.) An existing 7.2 kV distribution line parallels the proposed transmission line route, mostly on the opposite side of the road from the proposed route. (Hockmuth Report, p. 5.) The distribution line would be transferred to the proposed transmission line in the 2.5-mile segment outside the city limits. (Hockmuth Report, p. 5.) The proposed line would be built entirely within public road right-of-way and would include only one 90-degree corner. (Tr. 43.)

In selecting the proposed route, Cedar Falls considered the section 478.18 criteria, ease of construction, ease of access for maintenance, cost of construction and maintenance, shortest distance, and the need to minimize interference with land uses. (Tr. 42; Ex. 2.) The proposed route runs within and along existing right-of-way of roads and does not interfere with the use of highways or streams. (Petition Exs. A,

B; Tr. 42-43; Hockmuth Report, pp. 4-5; Exs. 2, 4.) Transmission lines built within a road right-of-way cause less functional impact than when built on private right-of-way. (Tr. 43.) In general, Cedar Falls will set the poles for the line on the road side of farm fences so adjacent property owners will have no poles on their property. (Tr. 43.) Cedar Falls purchases an overhang easement to prevent construction of buildings or other structures within 15 to 20 feet of the line, but owners may continue to use the land within the easement for farming, grazing, gardening, or as green space. (Tr. 43.)

Cedar Falls witness Mr. Johnson testified that the proposed route would not unnecessarily interfere with the use of land by its occupants. (Tr. 42.) He testified that any construction of a public improvement will disrupt or interfere with land uses, but Cedar Falls' goal was to interfere as little as it could. (Tr. 42.) Cedar Falls looked for a route with few businesses or residences where construction and operations would take place. (Tr. 42.) It looked for a route with businesses and homes located away from the proposed line and not clustered together. (Tr. 42.)

Cedar Falls evaluated five alternative routes. (Tr. 43-48, 64-71, 81-82; Exs. 3, 4.) Three of the alternate routes would be significantly more expensive than the proposed route. (Tr. 43-48, 64-71, 81-82; Exs. 3, 4.) Two of the alternate routes do not appear to be significantly more expensive, considering the entire cost of the proposed project. (Tr. 43-48, 64-71, 81-82; Exs. 3, 4.) Each of the alternatives has significant multiple practical problems, such as passing near many homes, crossing through a planned sports complex, requiring double circuiting, requiring additional

length and additional 90 degree corners, construction in congested areas, severe trimming or removal of trees, passing over an existing house, and following an S-curved highway and double crossing of an existing 69 kV line. (Tr. 43-48, 64-71, 81-82; Exs. 3, 4.)

Cedar Falls also evaluated several alternative routes suggested by the objectors, Ms. Joens and the Schous. (Tr. 46-47; Joens and Schou objections and letters filed.) One alternative was to start the line at the Cedar Falls' main office and run south along Highway 58. (Tr. 46; Joens and Schou objections.) Cedar Falls does not have 161 kV facilities at its main office, so this alternative would have no source of power, the route would not provide the needed second source of power for the Union Substation, and private right-of-way would be required for two miles. (Tr. 46.) The other alternatives suggested by the objectors would cross a housing addition, add one-half mile of length to the line at an additional cost of \$150,000, and would have similar problems as the alternate routes considered by Cedar Falls. (Tr. 43-48, 64-71, 81-82; Exs. 3, 4.) Mr. Johnson testified that all of the proposed alternate routes would do nothing more than move the aesthetic concerns from one group of residents to another group at additional cost to the Cedar Falls' ratepayers. (Tr. 47.)

Mr. Hockmuth inspected the objectors' suggested alternative route along Viking Road. (Hockmuth Report, p.5.) Viking Road has a 66-foot wide right-of-way compared to the 100-foot wide right-of-way of Ridgeway Avenue, there are numerous trees that would have to be removed or drastically trimmed, and there are numerous

homes within 100-150 feet of the line on both sides of the road. (Hockmuth Report, p. 5.) Mr. Hockmuth stated in his report that he would not choose this as a primary route. (Hockmuth Report, p. 5.)

Cedar Falls also evaluated the cost of underground construction of the proposed line. (Tr. 49.) The cost to build the overhead proposed line is \$300,000 per mile. (Tr. 47.) The cost to build the line underground is \$1.6 million per mile. (Tr. 47.) The total cost of the transmission portion of the project would increase from \$2.4 million to \$12.8 million if underground construction were used. (Tr. 47.)

The Schous would like the proposed line moved to a different route so that it does not pass their home and business. (Schou objections; letters filed; Tr. 181.) As discussed below, the Schous state that Mrs. Schou is extremely electromagnetically sensitive. (Schou objection and letters filed; Tr. 181-182, 184-186, 189-193; Exhibit DS-201.) Mr. Schou testified that they would like to have a different route because they think there would be a very low probability that there would be another person like Mrs. Schou on another route. (Tr. 181.)

Mr. Schou testified that Mrs. Schou is primarily sensitive to alternating current, but is also sensitive to direct current. (Tr. 190.) The Schous do not know at what level of exposure Mrs. Schou is no longer sensitive. (Tr. 191.) Mr. Schou testified that Queen Valley, Arizona, was tolerable to Mrs. Schou. (Tr. 192.) Mrs. Schou cannot currently tolerate being outside at the Schous' property. (Tr. 193.)

As will be discussed further below, when considering all the evidence presented by the Schous, the undersigned finds that the Schous did not present

persuasive evidence that the proposed transmission line would cause any harm to Mrs. Schou or to any other member of the public. (Schou objection and letters filed (including appendices A-D); Tr. 156-204; Exs. DS-201 through DS-203, DS-212 through DS-219.) They did not present persuasive evidence that the proposed line would unnecessarily interfere with the use of their property. (Schou objection and letters filed (including appendices A-D); Tr. 156-204; Exs. DS-201 through DS-203, DS-212 through DS-219.) There is nothing in the objections or in the additional evidence presented by the Schous that demonstrates an alternative route should be chosen. (Joens objection; Schou objection and letters filed (including appendices A-D); Tr. 156-204; Exs. DS-201 through DS-203, DS-212 through DS-219.) None of the concerns expressed by the objectors show that it would be just and proper to modify the proposed route. (Joens objection; Schou objection and letters filed (including appendices A-D); Tr. 156-204; Exs. DS-201 through DS-203, DS-212 through DS-219.)

When considering whether modifications to the location and route of a proposed line would be just and proper, the undersigned administrative law judge must consider the interests of the utility and all of its customers as well as the interests of the objectors. Iowa Code § 478.4. It would be unjust and improper to consider only the interests of the Schous and Ms. Joens when deciding whether to require modification of the route. Iowa Code § 478.4. The proposed line must be necessary to serve a public use and must have a reasonable relationship to an overall plan of transmitting electricity in the public interest. Iowa Code § 478.4. The

public interest means all the public. It does not mean one member of the public, or one family living along the proposed route.

The evidence presented demonstrates that the proposed route will not unnecessarily interfere with the use of land by its occupants. (petition for franchise; Tr. 42-55, 64-71, 73-75; 81-82; 84-97; 100-142; 156-201; Exs. 2 through 8; Joens and Schou objections and Schou letters filed (including appendices A-D); Exs. DS-201 through DS-203, DS-212 through DS-219; Hockmuth Report, pp. 4-5.) Cedar Falls has demonstrated that the route it selected is reasonable. (Tr. 42-48, 64-71, 80-82; Exs. 2, 3, 4; petition for franchise.) Cedar Falls has proven the proposed route meets the requirements of Iowa Code § 478.18 and is the most practical and reasonable alternative and it should be approved. (Tr. 42-55, 64-71, 73-75; 80-82; 84-97; 100-142; 156-201; Exs. 2 through 8; petition for franchise; Joens and Schou objections and Schou letters filed (including appendices A-D); Exs. DS-201 through DS-203, DS-212 through DS-219; Hockmuth Report, pp. 4-5.)

OBJECTIONS

Iowa Code § 478.5 provides that any person whose rights may be affected has the right to file a written objection to the proposed project or the grant of a requested franchise. Ms. Joens and the Schous filed objections in this case.

Ms. Joens' Objection

Ms. Joens owns property along the north side of Ridgeway Avenue. (Joens objection; petition for permit; Hockmuth Report; Exs. 2, 4; Tr. 48.) The proposed transmission line would run in the public right-of-way of Ridgeway Avenue along the

south edge of Ms. Joens' property. (Joens objection; petition for permit; Hockmuth Report; Exs. 2, 4; Tr. 47-48.) The poles for the proposed line would be placed in the public road right-of-way. (Tr. 47.) The field-side insulators and conductors would overhang Ms. Joens' property by less than five feet. (Tr. 47.) Cedar Falls has obtained a voluntary 20-foot overhang easement from Ms. Joens.¹ (Tr. 47.) There would be no transmission guys and anchors, although there may be distribution guys whose location would be negotiated with Ms. Joens. (Tr. 47.) Ms. Joens' house is between 50 and 100 feet north of the proposed line. (Tr. 48.)

In her written objection filed with the Board on September 2, 2003, Ms. Joens expressed a concern that the proposed line would give off harmful emissions if closer than 100 feet from a home. She stated her home would be closer than 100 feet, and that she would be getting her mail and mowing the lawn under the proposed line. She suggested an alternate route using Viking Road and either Hudson Road or Highway 58 instead of Ridgeway Avenue.

Ms. Joens chose not to testify at the hearing and did not file any written clarification to explain what she meant by harmful emissions. Ms. Joens may be referring to electric and magnetic fields. If she is referring to something other than electric and magnetic fields, there is nothing in the record that suggests or shows that there are any emissions from electric transmission lines.

¹ Even though Ms. Joens signed a voluntary easement, her objection is still before the Board for consideration since she did not withdraw it. In re: Midwest Power, Docket Nos. E-21043, E-21044, E-21045, "Decision and Order Granting Franchise" (March 9, 1993).

Cedar Falls designed the proposed line in a triangular configuration to reduce magnetic field levels. (Tr. 200-201.) As discussed above, the electric and magnetic field levels that will be produced by the proposed line at the edge of the right-of-way, along Ridgeway Avenue, and at the home of Ms. Joens will not be harmful to the public health and safety, including that of Ms. Joens. (Tr. 48-51, 53-55, 73-75, 88-97, 101-143, 200-201; Exs. 2, 4, 5-8.) There is nothing in the record that would support a finding that Ms. Joens' health would be harmed in any way by the presence of the proposed line as she retrieves her mail, mows her lawn, and lives in her home.

As discussed above, Cedar Falls and Mr. Hockmuth evaluated the alternate routes proposed by Ms. Joens, and there are significant problems associated with them. Also as discussed above, the evidence does not support a finding that the proposed route should be modified as suggested by Ms. Joens.

The Schous' Objection

The proposed transmission line would not be located on property owned by the Schous. (Tr. 48; Exs. 2, 4; Hockmuth Report.) Rather, the Schous own property that is across the road to the south from the proposed transmission line. (Tr. 48, 55; Exs. 2, 4; Schou objection and letters filed.) The proposed line would be approximately 97 feet north of the Schous' northern property line. (Tr. 48; Exs. 2, 4.) It would be approximately 400 feet from the Schous' house and approximately 250 feet from their office. (Tr. 48.)

The Schous have a business in which they conduct agricultural research on their property. (Schou objection and letters filed; Ex. DS-203.) Mr. Schou is an agronomist. (Tr. 95.)

In their written objection filed with the Board on September 2, 2003, the Schous expressed a number of concerns. (Schou objection.) The Schous stated that Mrs. Schou has been injured by the antenna transmissions from a cell tower near their property and she is extremely electromagnetic sensitive. They stated that high power electric transmission line emission exposure would most likely create an additional sensitivity, Mrs. Schou does not want to become overly sensitive to electricity and appliances, exposures are cumulative, and additional electromagnetic emission reactions would further deteriorate Mrs. Schou's health, work, and family life. The Schous stated they both live and work on their property and therefore do not leave for other jobs, and high power line emissions could lead to overexposure. They stated the construction of a high power electric transmission line would reduce their property value. They stated their agricultural research business may be affected by the unknown effects on agriculture and multiple products. In their objection, the Schous suggested a number of alternative routes for the proposed line that they stated would reduce exposure and other harmful effects. They attached a copy of a note dated May 30, 2003, from John Keiser, M.D., Covenant Clinic Medical Associates, Cedar Falls and Waterloo, Iowa, to their objection. The note stated: "To Whom It May Concern: Diane Schou has headaches that seem to have a definite relationship to the proximity of telephone transmission towers. These headaches

have interfered with her daily routines in a significant fashion." They also attached a number of maps showing their suggested alternative routes.

On October 29, 2003, the Schous filed a letter they stated was an addition to their objection to the granting of the franchise. The Schous stated that Mrs. Schou was seriously affected by power transmission lines including one in northern Cedar Falls which they understood to be similar to the proposed line. They therefore requested that the proposed line be routed away from their home, business, and farm. They stated that traveling between home and a barn office would be injurious if the line were installed along Ridgeway Avenue, and the proposed route would cause serious injury. The Schous stated that just driving along certain listed roads was very painful and serious and injury would immediately reoccur going along certain routes. They suggested changes to the alternate routes they previously suggested to avoid these roads. It appeared from the letter that the Schous were requesting that the line not be built along Ridgeway Avenue across from their home and business and also not be built along certain roads Mrs. Schou would travel north to Cedar Falls and east to Waterloo.

The Schous filed another letter on December 8, 2003. The Schous stated that electrical power lines, especially high power transmission lines, injure Mrs. Schou. They stated that because Mrs. Schou is electromagnetically sensitive, further injury is serious. They stated driving parallel to or underneath high power lines is screaming painful and to construct the line along Ridgeway Avenue would inject injury. They stated going between their house and office would cause injury, and injury that is real

has them pleading for survival. They stated outdoor exposure in the research plots of their business and entering and exiting their driveway would cause injury. The Schous stated they had a new objection that exposure at another farmhouse on their property would cause injury. They argued that Cedar Falls had voted to deliberately cause injury by routing the line according to the original proposed route and ignoring their objections. They challenged a number of statements they stated Cedar Falls had made in conversations between them regarding the proposed line. The Schous again proposed alternative routes. They stated: "Now that Diane has become sensitive to electrical power lines, the issue of simply driving to town forces a decision. The pain and injury from this exposure is new to us and it is serious. This is the reason for the adaptations above."

The Schous attached Appendices A through D to their letter. Appendix A is a recitation of the sequence of events the Schous state lead them to identify Mrs. Schou's electromagnetic injury from the cell tower. In Appendix A, the Schous stated that Mrs. Schou has reached the level of overexposure, toleration to electromagnetic emissions is zero, which means no frequency emissions, and "very low level/power/amplitude emissions still accumulates and injures." The Schous described Appendices B through D as "2003 research documenting the (simple) headache damage RF injured people incur from power lines, cell phones, wireless technology, and base stations." Appendix B states it is from the Internet and contains information alleging nerve cell damage in rat brains from mobile telephones. Appendix C contains two parts. The first part states it is a translation of an article

published in a Norwegian newspaper in 2002. The article is about a person who says she gets headaches from mobile telephones. The second part appears to be an excerpt from an Internet article that describes Arthur Firstenberg and Susan Molloy, two authors who say they are particularly sensitive to electromagnetic fields and chemicals. The article states the authors are advocates and advisors regarding electrical sensitivity. Appendix D appears to be an article from the Internet that describes the results of a Japanese research project that measured changes in blood flow in ten people, five of whom the article states have hypersensitivity to electromagnetic waves. The article states the researchers found that blood flow in the brains of people who complain of irritation from electromagnetic waves changes when they are exposed to cell phones and power lines, and the researchers believe the symptoms were caused either because the electromagnetic waves disrupted the nerve system and thus caused changes in the blood flow, or that the ability to maintain the brain's blood flow at a certain level was reduced. It states the findings are expected to contribute to understanding the symptoms, such as headaches and fatigue, for which the causal relationship with electromagnetic waves remains unknown. The article also states one of the researchers stated they want to conduct further research with more cases and higher precision, there has so far been no method to test for hypersensitivity to electromagnetic waves, and in some cases, factors other than electromagnetic waves were said to be the cause of the illness.

On December 22, 2003, the Schous filed additional information regarding their objection. This letter stated that Mrs. Schou had now grown sensitive to electric

space heaters and electric water heaters, requested that the proposed line not be located along Ridgeway Avenue, and attached an Internet article that states it is by Magda Havas, associate professor at Trent University, Canada, in the Environmental and Resource Studies program. The attached article is entitled "Cell phone headaches, cell tower blues." It describes what the author calls "Electromagnetic Hypersensitivity," and states that some people are gravely affected, they are not crazy, and they are "more sensitive than the rest of us to the electromagnetic noise pollution generated by our technological advances." The article describes the symptoms that a man who suffers from them attributes to cell phone towers. The article states that electromagnetic hypersensitivity has not yet been accepted by medical professionals, and it will take time and complaining patients before that changes. The article advocates that sufferers reduce their exposure to radio frequency radiation, urges government to restrict installation of cell phone antennas and establish "cell phone restricted" areas in public areas, and states the levels allowed for radio frequency radiation need to be reduced.

On February 18, 2005, the Schous filed another letter and Exs. DS-201 and DS-202. The letter stated Mrs. Schou's sensitivity/injury from electrical/magnetic fields became full blown in the fall of 2003, that it was painful for Mrs. Schou to approach the Cedar Falls facility, and since she gets the same symptoms when she is near microwave radiation, she suspects the microwave/radiation emissions from cell phone tower antennas are the cause. The Schous disputed Cedar Falls' challenge to Mrs. Schou's claim of ill effects that Cedar Falls had made in a letter

filed with the Board on April 29, 2004. The Schous stated their expectation that once they informed Cedar Falls of Mrs. Schou's symptoms, they thought Cedar Falls would reroute the line avoiding Ridgeway Avenue. They challenged Cedar Falls' proposed route. They stated standards need to be set to prevent injury and it was urgent to designate protected areas for people sensitive to electro/magnetic fields/radiation. They requested help to "clean" the electricity that is currently near and on the Schous' farm by burying or insulating electrical lines and wires in buildings and placing barriers around appliances. They described the development of Mrs. Schou's symptoms and stated that she informed Cedar Falls that: "she was injured by overexposure to microwave/radiation from a cell phone tower/antenna and that it was likely she would be susceptible to electrical/magnetic fields." They stated in the fall of 2003 Mrs. Schou became sensitive to power lines, she had headaches, and "discovered the source of her headaches by using a gauss meter – she had been driving parallel to electric lines." They stated Mrs. Schou's electrical/magnetic sensitivity later progressed to space heaters and furnace motors.

They further provided an update on Mrs. Schou's exposures and stated in late spring 2004 she began to become ill from coffee makers, air conditioners, etc. They stated she went to Sweden, which uses electricity with a different frequency than the United States (50 Hertz as opposed to 60 Hertz in the U.S.), and coffee makers and electric ranges did not hurt. However, during the three months she was in Sweden, she stated she grew sensitive to space heaters, refrigerators, fluorescent lights, computers, electrical instruments, and electric emissions in gasoline-powered cars.

She stated when she returned to the U.S. she could tolerate coffee makers but fluorescent lights and refrigerators still hurt. The Schous stated that most recently, 12-volt lights and vacuum cleaners hurt. The Schous requested the following accommodations at the hearing for Mrs. Schou's electrical/magnetic sensitivities: "no cell phones, no wireless communication (microphones, computers, cordless telephones) and refrigerators must be unplugged and fluorescent lights, ceiling fans and motors on furnaces and air conditioners turned off."

Exhibit DS-201 attached to the letter states it is a statement about Mrs. Schou by Ulrika Aberg, MD, "specialist in child and youth psychiatry with consulting rooms for amalgam and electrosensitive patients," Stjarnvagen, Skovde, Sweden. It states: "I have spent two hours today talking with this patient, sitting in a valley close to my home where I have my office. It is obvious that Diane is very sensitive to microwaves from mobile antennas and mobile phones, from power lines, fluorescent lights and other electric and electrical things. Because of this sensitivity it is extremely difficult for Diane to find a place to stay." Exhibit DS-202 is a duplicate of part of Appendix C described above. It contains the section of the article that describes author Susan Molloy.

On February 22, 2005, the Schous filed a replacement to the letter filed on February 18, 2005. The only substantive change was a clarification that Mrs. Schou stated she discovered the source of her headaches by using a gauss meter when she had been driving parallel to "typical electric lines, not high power lines." The Schous filed a second letter on the same date that described the Schous' property

and their business, ACRES (Agricultural Custom Research), and enclosed Exhibit DS-203, a brochure about the Schous' business.

On March 22, 2005, the Schous filed another letter regarding their objection and enclosed Exs. DS-212 and DS-213². In this letter, the Schous challenged the need for the proposed line, which is discussed above. The Schous stated that the measurements of gauss or micro-tesla can vary throughout the day, effects from magnetic fields are different from electrical fields, and the magnetic effects on calcium efflux in humans are of major concern to scientists. The Schous stated more research needs to be done before judgments are made and the Board should consider a precautionary procedure/principle. The Schous disagreed with statements that laboratory evidence fails to support a relationship between environmental electromagnetic levels and changes in biological functions. They stated that exposure to electromagnetic fields cannot be recognized as entirely safe, and Mrs. Schou has been affected. They stated there are scientific articles that show laboratory and field evidence of problems around power lines. They argued that proper protection would be to bury the proposed line, the increase in cost is justified, the system would be better if buried, and a buried line would not be unsightly. The Schous stated that their concern is public education as to the sensitivity and injury of

² In this letter, the Schous referred to a number of reports, documents, and articles that were not part of the record in the case. The Schous also referred to a website they stated contained a book. In an order issued March 23, 2005, the Schous were instructed that if they wished any of these items to be considered part of the record in the case, they had to file a copy with the Board's Records and Information Center.

Mrs. Schou to the proposed line and the threat to her life. They challenged the credibility of the research that showed no harmful effects from the line because they stated it was primarily funded by the power companies and government. They stated there is evidence from non-power company sources that says the opposite. They stated many cancer studies found incidences of cancer up 1.5 to 2.0 more times in the vicinity of power lines. They stated Mrs. Schou is electro sensitive and she will be severely injured by the magnetic radiation from the line. They stated levels radiating from similar lines have been documented to have a number of biological effects. They stated Mrs. Schou has traveled by a similar line north of Cedar Falls and felt the effects of the magnetic radiation on her system, and they assume the effects of the proposed line will be the same. They stated the World Health Organization categorized electromagnetic radiation as a carcinogen in 2002. They argued alternating currents have effects on humans, the hemoglobin or iron portion of our blood is affected by magnetism, and the hemoglobin is responsible for carrying oxygen in our systems, which is changed by the presence of electrical current. They argued the increased cost of an alternate route is worth the price to provide safety for Mrs. Schou. The Schous further stated auto electronics have started to affect Mrs. Schou's leg. They stated electro/magnetic fields now disable Mrs. Schou and she is in the process of obtaining disability status. The Schous demanded medical tests for themselves and their employees, medical instruments and staff to measure Mrs. Schou's health changes when she passes near the power lines for the rest of her life, and when Mrs. Schou demonstrates or experiences health changes, they demanded

the environment along Ridgeway be made safe, zero emissions, and that a safe humane haven be created for her when she can no longer tolerate influences that become new. The Schous stated the distance from the 6621 Ridgeway house is too close for safety. They stated it is a criminal and malicious approach to deliberately site the proposed line on Ridgeway Avenue since it will endanger Mrs. Schou's life. They state that she has presented doctors' statements that she is electrically sensitive and she should be given the same consideration as defined for disabled persons.

The Schous attached a survey from Switzerland they stated contained physiological reactions to electro/magnetic fields (power lines) that are similar to Mrs. Schou's as Ex. DS-212. They also attached an abstract of a publication by Rigmor and John Lind as Ex. DS-213, stated Rigmor is electro/magnetic sensitive, and stated Rigmor or John would be available as a witness for the hearing.

Ex. DS-212 is entitled "Health Symptoms Associated with Electromagnetic Radiation – A Questionnaire Survey" and appears to be an article regarding the survey copied from the Internet. The document states the authors of the article are Martin Roosli, Mirjana Moser, Martin Meier, and Charlotte Braun-Fahrlander and states it is from the Institute of Social and Preventative Medicine, Basel, Switzerland. It states that the authors are presenting preliminary results of the 342 questionnaires that were sent back between June 2001 and March 2002.

The article describes in detail how the survey was conducted starting in June 2001 and the questions asked. It states that health questionnaires were distributed

to people who complained about health symptoms that the people associated with exposure to electromagnetic radiation. It states the responders related their symptoms to exposure to mobile phone base stations (78%), mobile phones (38%), power lines (28%), cordless phones (28%), train and tram lines (21%), broadcast transmitters (20%), computer displays (20%), transformers (19%), TV display (16%), lighting (14%), and electrical devices (13%).

The article states: "The objective of the survey was to gain a better knowledge of the anxieties of the afflicted population, to obtain hints of possible problems and of actions that should be taken to solve the problems. The survey was not designed to establish a causal association between exposure to electromagnetic fields and health symptoms."

The article described the people who responded to the survey and their symptoms in great detail, and stated that sleep disorders, headaches, nervousness/distress, concentration difficulties, and fatigue were most prevalent. The article described actions respondents had taken to seek help and reduce their symptoms. The article cited to a number of other articles regarding the issue. It stated an increasing number of people are claiming they are hypersensitive to electromagnetic fields, the prevalence varies in a broad range across countries, it is estimated that less than one percent of the population is afflicted, and recently a survey in Stockholm found that 1.5 percent of the population declared themselves as suffering from electric hypersensitivity syndrome (EHS).

The article stated that although many acute health effects have been cited, the results of controlled experiments have been contradictory, and thus a direct causal link between exposure to electric or magnetic fields below recommended reference levels and self-reported symptoms has not been established so far. It stated there is no specific symptom profile or validated diagnostic criteria to establish EHS. It stated: "Apart from a pure field phenomena, other causes of EHS, such as distress, neuroticism, psychiatric morbidity and public debate have also been discussed."

The article stated that the symptom pattern found in the survey corresponded to the symptom pattern that is associated to electromagnetic fields in the public debate. It further stated: "However, this survey must be carefully interpreted with respect to causal associations. Though causal associations cannot be excluded at the present knowledge, the result of this survey may reflect primarily a concern among a part of the Swiss population about health risks from the ubiquitous exposure to electric and magnetic fields." The article stated it was designed to gain a better knowledge of the afflicted population's point of view, that complainants rated their physical impairment quite severe, and that data analysis of the survey was not complete and further analysis was planned.

Ex. DS-213 is an abstract about the book "Black on White" that appears to be copied from the Internet. The abstract stated that "Black on White" is a translation of a Swedish book by Rigmor Granlund-Lind and John Lind available in English on the Internet. It stated the book is based on statements and letters gathered from more than 400 people who say they are electro-hypersensitive or from people who are in

close contact with them. The statements and letters arose from a Swedish forum held March 8, 2000, which was stated to be an opportunity for persons suffering from electro-hypersensitivity and persons in contact with them to speak out. (Ex. DS-216a.) The abstract further stated that the book included people's explanations of what started their electro-hypersensitivity, the factors causing their symptoms, their descriptions of their symptoms, effects on their lives, and how they were treated.

The Schous filed another letter on March 29, 2005, and attached Exs. DS-214, DS-215, DS-216a, DS-216b, DS-216c, DS-216d, and DS-217. The Schous stated this letter was a response to the order issued March 23, 2005, and it included copies of documents the Schous had referred to in their March 22, 2005, letter. In their letter, the Schous reiterated their request that the proposed line either follow one of the alternate routes previously suggested or be buried. Ex. DS-214 is a copy of three pages of the 1978 consulting engineer's study of the transmission connections between Iowa Public Service and Cedar Falls Utilities discussed above regarding the need for the proposed line. Ex. DS-215 is a copy of three pages from the National Institute of Environmental Health Sciences (NIEHS) Report on the health effects from exposure to power line electric and magnetic fields from 1999. The Schous disputed some of the conclusions of the report and challenged some of its research. Exs. DS-216a, 216b, 216c, and 216d contain extensive excerpts from the book entitled "Black on White." The exhibit quotes many people's statements from the book. A number of the people described the symptoms they experienced, their views of what triggered their symptoms, and the effects of the symptoms on their lives. A number of the

people called for further research. They expressed frustration that electro-hypersensitivity is not recognized as a physical illness by mainstream medicine, that they have been unable to receive help from the healthcare system, and that research studies have not been able to establish a connection between electricity and illness. Ex. DS-217 is a paragraph that appears to be copied from the Internet regarding a study that tested psychological treatment of patients with electric hypersensitivity. The paragraph states that 17 patients were tested and the study indicates that "psychological treatment may be of value in this disease." The exhibit also states that: "The conclusion from the provocation test is that this group of alleged hypersensitive patients did not react to the electromagnetic field."

As discussed above, Mr. Schou testified at the hearing and Mrs. Schou did not. In addition to the testimony discussed above, Mr. Schou testified that there is an interaction between weak low frequency magnetic fields and cell membranes, that calcium efflux is affected by power lines, and he introduced Exs. DS-218 and DS-219 in support of his position. (Tr. 175-179, 183.) However, he admitted on cross-examination that there is nothing that indicates calcium efflux is related to a human health problem. (Tr. 194-195.)

Mr. Schou testified that the relationship between cell phones and power lines is shown by the anecdotal information of author Mrs. Rigmor Granlund-Lind: that you can be injured by one and you will be susceptible to the other. (Tr. 182, 193.) He testified that cell towers caused Mrs. Schou to be susceptible to electric fields. (Tr. 193.) He testified that his wife shows sensitivity and the sensitivity has changed

over time. (Tr. 190.) Mr. Schou testified that electro-sensitivity is real and he is trying to protect his wife. (Tr. 182-187.)

Rigmor Granlund-Lind, author of "Black on White," testified on behalf of the Schous. (Tr. 157-165.) Ms. Granlund-Lind testified that the people in "Black on White" are real and there are letters from more than 400 people. (Tr. 157.) She testified that the Council for Work Life Research was commissioned by the Swedish government to survey Swedish and international research regarding electro-hypersensitivity. (Tr. 158.) One part of that process invited persons to write letters regarding their electro-hypersensitivity, and that is how they obtained the letters. (Tr. 158.) She testified the plan was to publish the letters, but they were not published. (Tr. 158.) Therefore, Ms. Granlund-Lind took parts of more than 250 letters to write the book. (Tr. 158.) She testified it is very difficult for people who cannot stand microwave radiation from cellular towers or mobile telephones and they have to move to the country. (Tr. 159.) She testified that some people must move abroad to India. (Tr. 159.)

In their objection, the Schous expressed the concern that there would be a negative impact on their property value from the proposed line. (Schou objection.) They presented no evidence to support this. As discussed above, the proposed line would not cross the Schou's property. There was no evidence presented that the proposed transmission line would have a negative effect on property value of land that is near, but not crossed by, the proposed transmission line.

Findings in contested cases must be based on the kind of evidence on which reasonably prudent persons are accustomed to rely for the conduct of their serious affairs. Iowa Code § 17A.14(1). Witnesses at the hearing, or persons whose testimony has been submitted in written form if available, shall be subject to cross-examination as necessary for a full and true disclosure of the facts. Iowa Code § 17A.14(3).

The undersigned has carefully examined all of the evidence provided by the Schous. Since the Schous were unrepresented by counsel, the undersigned gave the Schous considerable latitude in the form of the evidence they presented. However, evidence presented through the testimony of witnesses who are available for cross-examination by opposing parties is the ordinary method of introducing evidence and is the most persuasive form of evidence in contested cases. Some of the Schou's evidence consisted of items copied from the Internet that had no associated sponsoring witness. This type of evidence was not particularly persuasive because it is very difficult to evaluate the quality of the evidence and there was no witness subject to cross-examination who sponsored the information and could testify about it.

In addition, the Schous' only medical evidence consisted of copies of two letters from two doctors who did not testify. This evidence was also not particularly persuasive because the doctors did not testify and were not available to answer questions and be cross-examined. The evidence was not persuasive that Mrs. Schou's illness would be adversely affected by the presence of the proposed line

because Dr. Kaiser's note related only to telephone transmission towers, and Dr. Aberg's note stated she is a specialist in child and youth psychiatry and she apparently talked with Mrs. Schou for only one two-hour period. The note does not explain the basis of Dr. Aberg's statement that: "It is obvious that Diane is very sensitive to microwaves from mobile antennas and mobile phones, from power lines, fluorescent lights and other electric and electronic things," and there were no laboratory or other medical test results submitted to support the statement. It is also not clear whether Dr. Aberg was referring to a psychological or a physical sensitivity.

While it is clear that the Schous believe Mrs. Schou was injured by cellular towers and then became sensitive to electricity, they presented no persuasive scientific evidence that proves this. (Schou objection and letters filed (including appendices A-D); Tr. 156-201; Exs. DS-201-203, DS-212-219.) As Mr. Hockmuth stated in his report, radio frequency emissions from cellular towers are much different than electric line emissions. (Hockmuth Report, p. 8.) Cellular telephones operate in the 800-900 megaHertz (MHz) range and are a high-energy signal designed to travel long distances. (Hockmuth Report, p. 8.) The alternating current in an electric line produces 60-Hertz fields and the field drops off rapidly with distance from the source. (Hockmuth Report, p. 8.) Therefore, the undersigned finds that the Schou's evidence regarding cellular telephones and cellular telephone towers is irrelevant to this proceeding involving an electric transmission line.

When considering all the evidence presented by the Schous, the undersigned finds that the Schous did not present persuasive evidence that the proposed

transmission line would cause any harm to Mrs. Schou or to any other member of the public. (Schou objection and letters filed (including appendices A-D); Tr. 156-201; Exs. DS-201-03, DS-212-19.) While the Schou's evidence shows that Mrs. Schou suffers significant health symptoms that adversely affect her life, their evidence does not prove any causal relationship between Mrs. Schou's illness and electric transmission lines. (Schou objection and letters filed (including appendices A-D); Tr. 156-201; Exs. DS-201-03, DS-212-19.) The evidence the Shous presented does not show that Mrs. Schou would be harmed in any way by the presence of the proposed transmission line. (Schou objection and letters filed (including appendices A-D); Tr. 156-201; Exs. DS-201-03, DS-212-19.)

The undersigned finds the testimony of Dr. Lamont and Dr. Sires to be far more persuasive than that presented by the Schous regarding whether there would be any adverse health effects from the proposed electric transmission line because they have clearly established expertise in relevant areas and they submitted prefiled testimony, testified at the hearing, and were subject to cross-examination. (Tr. 84-143.) In addition, the testimony provided by Drs. Lamont and Sires is based on mainstream scientific and medical studies. (Tr. 84-143.)

As discussed above, Dr. Sires, a board-certified neurologist and the only medical doctor to testify in the case, testified that he is not aware of any specific neurologic syndrome associated with exposure to electromagnetic fields, that when he has heard that complaint, it is commonly in association with psychiatric rather than neurologic illness, and that there is no organic neurologic dysfunction that comes

from exposure to electromagnetic fields. (Tr. 89.) He testified he is not aware that headaches, fatigue, nausea or other nonspecific symptoms are caused by such fields. (Tr. 89-90.) Dr. Sires testified there is no evidence that power lines such as the proposed line cause any organic disease in humans. (Tr. 93-95.) Dr. Sires admitted on cross-examination that there are circumstances in which no diagnosis can be made. (Tr. 95-96.) However, the evidence presented in this case by both Cedar Falls and the Schous shows that scientific and medical studies have not established a causal connection between electric transmission lines and the health symptoms such as those described by Mrs. Schou. (Schou objection and letters filed (including appendices A-D); Tr. 48-55, 73-75, 84-97, 100-142, 156-201; petition for franchise; Exs. 1-8; Exs. DS-201-03, DS-212-19.)

Although the Schous expressed a concern that their agricultural research business may be affected by the proposed line, they did not present evidence to support this concern. (Schou objection.) As discussed above, Cedar Falls' witness Dr. Lamont, who has conducted studies on the effects of electric transmission lines, has found that there is no evidence of adverse impacts from such lines on corn and soybeans. (Tr. 105-106.) The record does not support a finding that the Schous' business will be adversely affected by the proposed line.

In addition to requesting alternative routing of the proposed line, the Schous stated that standards need to be set to prevent injury. (February 18, 2005, letter.) The Schous did not state specifically what standards they meant, and there is no evidence in the record to support the Board setting such standards. The Schous also

stated that protected areas for sensitive people should be designated and they requested help to "clean" the electricity near and on their farm by burying or insulating electric lines and wires in buildings and placing barriers around appliances. (February 18, 2005, letter.) In their March 22, 2005, letter, the Schous requested medical tests, instruments, staff to measure Mrs. Schou's health changes, and a safe haven for her. The Board does not have the authority to order these kinds of actions.

The evidence does not support a finding that the proposed route should be modified as suggested by the Schous. The Schous' objection, letters, and evidence presented do not provide a reason to deny the requested franchise. Nor do they provide a reason to require any additional terms or modifications of the requested franchise.

Cedar Falls' petition for a franchise in Docket Number E-21647 should be granted.

FINDINGS OF FACT

1. Notice of the informational meeting was given, the informational meeting was held, and notice of the petition in Docket No. E-21647 was published and served as required by Iowa Code Chapter 478. (petition for franchise; proof of publication; Hockmuth Report.)
2. Cedar Falls has agreed to pay all costs and expenses of this franchise proceeding as required by Iowa Code § 478.4. (petition for franchise).
3. The proposed transmission line is necessary to serve a public use. (petition for franchise; Hockmuth Report; Tr. 39-42, 52, 56-62.)

4. The proposed transmission line represents a reasonable relationship to an overall plan of transmitting electricity in the public interest. (petition for franchise; Tr. 39-65, 156-65, 170, 175-95, 197-200; Exs. 2-8; objections and letters filed; Exs. DS-201-03, DS-212-19; Hockmuth Report.)

5. The proposed transmission line will conform to the construction and safety requirements of Iowa Code §§ 478.19 and 478.20 and applicable Board rules at 199 IAC 11 and 25. (petition for franchise; Tr. 47-48, 63-64; Hockmuth Report.) No terms, conditions or restrictions regarding construction and safety requirements need to be imposed pursuant to Iowa Code § 478.4.

6. Although the objectors raised questions with respect to the health effects of the proposed lines, they presented no evidence regarding electric or magnetic field levels of the proposed line and no persuasive evidence that showed there would be any adverse health effect from the electric and magnetic fields of the proposed line at issue in this case. (Joens objection; Schou objection and letters filed (including appendices A-D); Tr. 94-97, 122-131, 156-165, 169-200; Exs. DS-201-03, DS-212-19) Cedar Falls has presented sufficient proof that it designed the proposed line to reduce magnetic field levels and that the electric and magnetic field levels that will be produced at the edge of the right-of-way of the proposed line, along Ridgeway Avenue, and at the homes and business of the objectors, will not be harmful to the public health and safety. (Tr. 48-51, 53-55, 73-75, 88-97, 101-143, 200-01; Exs. 2, 4, 5-8.) No additional terms, conditions, or restrictions related to electric and magnetic field levels need to be imposed pursuant to Iowa Code § 478.4.

7. The evidence presented demonstrates that the proposed route will not unnecessarily interfere with the use of land by its occupants. (petition for franchise; Tr. 42-55, 64-71, 73-75; 81-82; 84-97; 100-142; 156-201; Exs. 2-8; Joens and Schou objections and Schou letters filed (including appendices A-D); Exs. DS-201-03, DS-212-19; Hockmuth Report, pp. 4-5.) Cedar Falls has demonstrated that the route it selected is reasonable. (Tr. 42-48, 64-71, 80-82; Exs. 2, 3, 4; petition for franchise.) Cedar Falls has proven the proposed route meets the requirements of Iowa Code § 478.18 and is the most practical and reasonable alternative and it is approved. (Tr. 42-55, 64-71, 73-75; 80-82; 84-97; 100-142; 156-201; Exs. 2-8; petition for franchise; Joens and Schou objections and Schou letters filed (including appendices A-D); Exs. DS-201-03, DS-212-19; Hockmuth Report, pp. 4-5.)

8. The evidence presented in this case by both Cedar Falls and the Schous shows that scientific and medical studies have not established a causal connection between electric transmission lines and health symptoms such as those described by Mrs. Schou. (Schou objection and letters filed (including appendices A-D); Tr. 48-55, 73-75, 84-97, 100-142, 156-201; petition for franchise; Exs. 1-8; Exs. DS-201-03, DS-212-19.) The objections filed by Ms. Joens and the Schous do not provide a reason to deny the requested franchise or require modification of the route. Nor do they provide a reason to require any additional terms or modifications of the requested franchise.

CONCLUSIONS OF LAW

1. The Board has the authority to grant franchises to construct, erect, maintain, and operate transmission lines capable of operating at an electric voltage of 69 kV or more along, over, or across any public highway or grounds outside of cities for the transmission, distribution, or sale of electric current. Iowa Code § 478.1.

2. The Board may grant franchises in whole or in part upon such terms, conditions, and restrictions, and with such modifications as to line location and route, as may seem to it just and proper. Iowa Code § 478.4.

3. Iowa Code § 478.18 requires transmission lines to be constructed near and parallel to roads and railroads and along division lines of land wherever practical and reasonable. The same section requires the utility to construct the line so as not to interfere with the use of the public of the highways or streams of the state and so as not to unnecessarily interfere with the use of any lands by the occupant. Cedar Falls' proposed route is the most practical and reasonable alternative and it is approved.

4. To obtain a franchise, the petitioner must show that the proposed line is necessary to serve a public use and represents a reasonable relationship to an overall plan of transmitting electricity in the public interest. Iowa Code § 478.4.

5. Cedar Falls has met the requirements of Iowa Code Chapter 478 and 199 IAC Chapters 11 and 25, and a franchise should be issued to Cedar Falls for the transmission line described in the petition.

IT IS THEREFORE ORDERED:

1. Official notice is taken of the report dated November 23, 2004, filed by Mr. Dennis Hockmuth.

2. Motions and objections not previously granted or sustained are overruled. Arguments in written filings or made orally at the hearing that are not addressed specifically in this proposed decision and order are rejected, either as not supported by the evidence or as not being of sufficient persuasiveness to warrant comment.

3. Pursuant to Iowa Code Chapter 478 and 199 IAC 11 and 25, the petition is hereby granted. If this proposed decision and order becomes the final order of the Board, a franchise will be issued to Cedar Falls to construct, erect, operate, and maintain the electric transmission line as specifically described in the petition. If this proposed decision and order becomes the final order of the Board, the franchise will be issued to Cedar Falls after the proposed decision and order becomes the final order of the Board.

4. The Board retains jurisdiction of the subject matter in this docket pursuant to Iowa Code Chapter 478, and may at any time during the period of the franchise make such further orders as may be necessary.

5. This proposed decision and order will become the final order of the Board unless the Board moves to review it or a party files an appeal to the Board within 15 days of its issuance. 199 IAC 7.8(2).

6. A copy of this proposed decision and order will be served by ordinary mail upon Cedar Falls, the Consumer Advocate, Ms. Joens, and the Schous.

UTILITIES BOARD

/s/ Amy L. Christensen
Amy L. Christensen
Administrative Law Judge

ATTEST:

/s/ Judi K. Cooper
Executive Secretary

Dated at Des Moines, Iowa, this 6th day of July, 2005.