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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. EA-2014-0207

SURREBUTTAL TESTIMONY OF

THOMAS PRIESTLEY, Ph.D.

ON BEHALF OF

GRAIN BELT EXPRESS CLEAN LINE LLC

October 14, 2014

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1 **I. WITNESS INTRODUCTION AND PURPOSE OF TESTIMONY**

2 **Q. Please state your name, present position and business address.**

3 A. My name is Thomas Priestley. I am a Senior Environmental Planner with CH2M HILL.
4 My business address is 1000 Wilshire Boulevard, Los Angeles, CA 90017.

5 **Q. What is your educational background?**

6 A. I have a bachelor's degree in urban planning from the University of Illinois at Urbana-
7 Champaign. At the College of Environmental Design at the University of California at
8 Berkeley I earned a master's degree in landscape architecture with an emphasis in
9 environmental planning; a master's degree in city and regional planning; and a Ph.D. in
10 environmental planning.

11 **Q. What research have you conducted regarding the impact of transmission lines on
12 property values?**

13 A. I have extensive experience in researching the impact of transmission lines on property
14 values. For example, in the late 1980s I became part of a research team that searched for
15 and reviewed all of the available research on transmission line property value impacts. In
16 1992, Dr. Cynthia Kroll and I prepared a systematic summary and critical review of this
17 literature, which was published as a report by the Edison Electric Institute.¹ Our research
18 team designed and executed a study that analyzed over 960 sales in six suburban residential
19 neighborhoods and that assessed the impact of proximity to transmission lines on property
20 values. We analyzed the relevant data using hedonic modeling, which made it possible to
21 identify the property value effects of a range of factors, including proximity to the
22 transmission line.

¹ Kroll, C., and T. Priestley, 1992. *The Effects of Overhead Transmission Lines on Property Values*. Edison Electric Institute Siting and Environmental Planning Task Force, Washington, D.C., 101 pp.

1 I have continually updated the research review Dr. Kroll and I prepared in 1992. For
2 example, I updated the research review in 1995 in preparation for expert witness testimony
3 on the impacts of transmission lines on property values I gave to the Emerging Technology
4 Issues Advisory Committee of the Virginia General Assembly Joint Commission on
5 Technology and Science.² Also, I updated the literature review in 2008 when I prepared an
6 analysis of property value issues associated with a proposed 400 kV DC transmission line in
7 upstate New York.³ In addition, I updated the literature review in 2010 when I prepared an
8 analysis of the property value effects of a proposed 500 kV AC line in Montana and Idaho.⁴

9 **Q. Do you have a curriculum vitae?**

10 A. Yes. It is attached as Schedule TP-1.

11 **Q. What is the purpose of your surrebuttal testimony?**

12 A. I am responding to certain issues presented in the rebuttal testimonies of Kurt Kielisch
13 (pages 3-27) and Boyd Harris (pages 2-6) regarding their opinions and conclusions on the
14 effect of the Grain Belt Express Project on land values and land use.

² Priestley, Thomas. *Transmission Lines and Property Values: Review of the Research and Summary of Key Findings: Report to the Emerging Technology Issues Advisory Committee of the Virginia General Assembly Joint Commission on Technology and Science*. July, 2005.

³ Priestley, Thomas. *Transmission Lines and Property Values: Review of the Research and Summary of Key Findings*. Prepared for New York Regional Interconnection, Inc., May, 2007.

⁴ Priestley, Thomas. *Transmission Lines and Property Values: Review of the Research and Summary of Key Findings*. Prepared for the Montana Department of Environmental Quality, June, 2009.

1 **II. BACKGROUND REGARDING THE IMPACT OF ELECTRIC TRANSMISSION**
2 **LINES ON PROPERTY VALUES**

3 **Q. What kinds of studies have been conducted regarding the potential effects of**
4 **transmission lines on property values and what methods do they use?**

5 A. The research that has been done on the property value impacts of transmission lines falls
6 into three broad categories:

7 1. Appraiser Studies.

8 2. Attitudinal Surveys.

9 3. Statistical Analyses.

10 **Q. What does the term appraiser studies mean?**

11 A. The earliest studies that attempted to evaluate the influence of transmission lines on property
12 values were conducted by appraisers, who were responsible for almost all the transmission
13 line property value impact studies done before 1975. The appraisal technique used for this
14 research involves paired-sales analysis, which entails comparing sales prices for properties
15 located close to the transmission line of interest with the sales prices of carefully matched
16 properties located in areas outside of the transmission line's zone of influence, and then
17 noting any price differences, which are assumed to be related to the property's physical
18 relationship to the transmission line. Traditionally, descriptive statistics have been used to
19 compare sales in the two areas to determine the effect of the transmission line on sales price.
20 In recent years, some studies have applied statistical tests in an effort to establish the
21 significance of the relationships.

22 **Q. What are the limitations of appraiser studies?**

23 A. One limitation of the paired sales approach is that appraisers have to use subjective
24 judgment to identify identical properties, and it is often difficult to find a sufficient number

1 of pairs to provide a representative sample of the market.⁵ A critical concern is that the
2 paired sales approach may not provide statistically reliable results because differences not
3 perceived by the researcher between the properties in the pairs may contribute to the price
4 differences between the properties.⁶

5 **Q. What are attitudinal studies?**

6 A. Attitudinal surveys are studies that have been used to determine how property owners or real
7 estate professionals perceive the effect of transmission lines on property sale values. In
8 some cases, this data reflects the public's perceptions of the full range of a transmission
9 line's potential impacts. In other cases, the surveys are restricted to property value issues.
10 Occasionally, the data is collected and used as part of a contingent valuation modeling
11 process that attempts to quantify likely purchasing behavior by potential buyers.

12 **Q. What are the limitations of attitudinal studies?**

13 A. The results of attitudinal surveys must be treated with great caution because what residents
14 and even real estate professionals say about what they think the effects of transmission lines
15 might be on property values may, in fact, be quite different from the actual effects that
16 occur.

17 For example, in their summary of the results of an advanced analysis of a
18 comprehensive survey of perceptions of those living near transmission lines, Priestley and
19 Evans found respondents may have a tendency to overstate the transmission line's effects.⁷

20 In a 1994 conference paper, William Kinnard and colleagues point out that there can be a

⁵ Kinnard, W., and S. Dickey. 1995. A primer on proximity impact research: residential property values near high-voltage transmission lines. *Real Estate Issues* 20 (1):23-29.

⁶ Kroll, C., and T. Priestley. 1992. *The Effects of Overhead Transmission Lines on Property Values*. Edison Electric Institute Siting and Environmental Planning Task Force, Washington, D.C., 101 pp.

⁷ Priestley, T., and G. Evans. 1996. Resident perceptions of a nearby electric transmission line. *Journal of Environmental Psychology* 16: 65-74.

1 significant divergence between opinions expressed in the abstract in response to a survey
2 question and actual behavior.⁸ For example, Kinnard et al. cite their findings in a study of
3 the property value impacts of a transmission line in Orange County, New York, in which
4 they interviewed real estate professionals active in the local market and owners of properties
5 adjacent to the transmission lines, in addition to conducting statistical analyses of the actual
6 effect of the transmission line on sales prices. They found that the real estate professionals
7 had a more negative perception of the transmission line's effects on property values than the
8 owners of the properties alongside the line, and that these perceptions of negative effect
9 were not supported by the analysis of the actual sales prices, which found no statistically
10 significant reduction in the sales prices of properties located alongside the transmission
11 line.⁹

12 **Q. Please explain statistical analyses.**

13 A. In this context, the term "statistical analysis" is used to refer to studies that have used large
14 samples of sales data and have analyzed them using multiple regression analysis. Since the
15 mid-1970s, there has been an increasing reliance on the use of multiple regression analysis
16 in the hedonic pricing model format for transmission line property value studies. Regression
17 analysis is a statistical method by which the changes in a variable of interest, known as the
18 dependent variable (which in a property value study would be the sales prices of the

⁸ Kinnard, W., M. Geckler, and S. Dickey. 1994. *Fear (As A Measure of Damages) Strikes Out: Two Case Studies Comparisons Of Actual Market Behavior With Opinion Survey Research*. A Paper Prepared for Presentation at the 1994 Annual Conference American Real Estate Society. Santa Barbara, California. April 16.

⁹ Kinnard, W. N. Jr., J. K. Geckler, J. B. Kinnard, and P. S. Mitchell. 1988. *Effects of Proximity to High-Voltage Electric Transmission Lines on Sales Prices and Market Values of Vacant Land and Single-Family Residential Property: January 1978 - June 1988, (An Analysis of Real Estate Market Activity in Penobscot County, Maine)*. Storrs, Connecticut: Real Estate Counseling Group of Connecticut. December.

1 properties in the study area) are explained as a function of changes in other factors that are
2 known as explanatory variables or regressors. Regression analysis allows the relationship
3 between the dependent variable and each of the explanatory variables to be displayed in a
4 model and estimated, providing a numerical estimator for each relationship.

5 The hedonic pricing model format is commonly used to structure the regression
6 model. It assumes that the amount paid for the purchase of a property reflects the value
7 placed on specific attributes of the home and property. Using this approach allows the
8 relationship between property value and the variables that determine it to be statistically
9 isolated, and the relative contribution to property value of each of the explanatory variables
10 to be identified.

11 The use of the multiple regression approach requires a large data set of sales in the
12 area of potential impact and in a control area. For each sale, data is required for variables
13 related to the broad spectrum of factors potentially affecting sales price, including variables
14 that measure the distance from and the visibility of the transmission line. Through use of
15 multiple regression analysis in the hedonic pricing model format, it is possible to identify
16 each variable that has a statistically significant effect on property sales value in the study
17 area and to identify the percentage of the total sales value that can be attributed to each of
18 the variables.

19 **Q. Has the statistical analysis approach relying on regression/hedonic modeling become**
20 **the preferred approach for conducting transmission line property value impact**
21 **studies?**

22 A. Yes. The multiple regression/hedonic modeling approach is now the approach that is
23 favored by academic researchers and professionals as the means to identify the effects of

1 transmission lines on sales prices.¹⁰ Hedonic modeling is also in widespread use for
2 evaluating the effects of environmental and other variables on property value. Hedonic
3 modeling can also take into account neighborhood factors, such as location relative to roads,
4 public transportation, and airports, as well as school quality, crime levels, and water
5 amenities.¹¹

6 **Q. Why is the statistical analysis approach that relies on regression/hedonic modeling now**
7 **preferred over the other approaches for conducting transmission line property value**
8 **impact studies?**

9 A. The value of the multiple regression/hedonic modeling studies is that because they reflect
10 the prices that buyers actually pay, rather than speculation about what buyers might do under
11 hypothesized conditions, they more reliably reflect actual transmission line effects than the
12 attitudinal surveys. In addition, the multiple regression/hedonic modeling studies remove
13 the subjectivity inherent in appraiser paired sales analyses and the use of large sample sizes
14 and advanced statistical techniques makes the results considerably more reliable than those
15 of the paired sales studies. Furthermore, there is some evidence that the results of the
16 multiple regression/hedonic modeling studies can be transferred from one market area to
17 another.¹²

¹⁰ Kinnard, W., and S. Dickey. 1995. A primer on proximity impact research: residential property values near high-voltage transmission lines. *Real Estate Issues* 20 (1):23-29.

¹¹ Boyle, M., and K. Kiel. 2001. A survey of house price hedonic studies of the impact of environmental externalities. *Journal of Real Estate Literature* 9 (2): 117-144.

¹² Kinnard, W., and S. Dickey. 1995. A primer on proximity impact research: residential property values near high-voltage transmission lines. *Real Estate Issues* 20 (1):23-29.

1 **Q. Is the research that has been done on the property value effects of transmission lines**
2 **helpful?**

3 A. Yes. Although the research that has been done to date on the question of transmission line
4 effects on property values is not unanimous in its conclusions; taken as a whole, it provides
5 a frame of reference for understanding possible transmission line/property value
6 relationships, and it brackets the range of magnitudes of any potential effects. Research
7 studies have examined how the presence of high-voltage overhead transmission lines affect
8 the values of properties, including single-family residences, vacant residential land,
9 recreational property, and agricultural land. These studies have also examined the role of
10 distance and time on the transmission line/property value relationship. Questions that are
11 typically asked during the research efforts include: If effects are present, what are the
12 direction and magnitude of those effects? Are there differences in effect related to type of
13 property? Are there characteristics of the line or right-of-way that appear to be associated
14 with the effects?

15 **Q. Does the presence of high voltage overhead transmission lines on or near a single**
16 **family property affect the value of that property?**

17 A. Most of the research studies based on paired sales analysis have found that transmission
18 lines have no effect on the value of nearby single-family residences. These studies include
19 Blanton;¹³ Bottemiller, Cahill, and Cowger;¹⁴ Cowger, Bottemiller, and Cahill;¹⁵ Earley and

¹³ Blanton, Herman W. 1980. *A Study of Transmission Line Effects on Subdivisions in Harris County, Texas.*

¹⁴ Bottemiller, S., J. Cahill, and J. Cowger. 2000. Impacts on residential property values along transmission lines; an update study of three Pacific Northwest metropolitan areas. *Right of Way* 18 (July August): 18-20, 55.

1 Earley;¹⁶ and Rhodeside and Harwell and A. White.¹⁷¹⁸¹⁹ In addition, a number of the
2 analyses using multiple regression analysis, including Kinnard et al. (1984), Kinnard (1988),
3 Kinnard, Geckler, and DeLottie (1997), Kinnard et al. (1997) and Wolverton and
4 Bottemiller (2003), found that transmission lines do not have a significant effect on the sales
5 prices of nearby properties, including single-family homes.²⁰ A few of the paired-sales

¹⁵ Cowger, J., S. Bottemiller, and J. Cahill. 1996. Transmission line impact on residential property values; a study of three Pacific Northwest metropolitan areas. *Right of Way* 43 (September/October): 13-17.

¹⁶ Earley, Edward M., and Michael H. Earley. 1988. *Real Estate Market Data Analysis* (for a proposed 230 kV Electrical Transmission Line, Transylvania County, North Carolina; prepared for Duke Power Company), Golden, Colorado.

¹⁷ Rhodeside and Harwell and A. White. 1992. *Transmission Line Impact on Property Values*. Prepared for Virginia Power. Alexandria, Virginia: Rhodeside and Harwell

¹⁸ Rhodeside and Harwell and A. White. 1995. *Transmission Line Impact on Property Values; Supplemental Study: Visibility*. Prepared for Virginia Power. Alexandria, Virginia: Rhodeside and Harwell.

¹⁹ In two of the three Virginia regions analyzed, Rhodeside and Harwell found no effect on the value of properties located adjacent to transmission line rights-of-way. In the Eastern region, they found that location adjacent to a right-of-way was associated with an increase in property value.

²⁰ Kinnard, W. N. Jr., M. B. Geckler, J. K. Geckler, J. B. Kinnard, and P. S. Mitchell. 1984. *An Analysis of the Impact of High Voltage Electric Transmission Lines on Residential Property Values in Orange County, New York*. Storrs, Connecticut: Real Estate Counseling Group of Connecticut. May.

Kinnard, William N. Jr. 1988. *The Effect of High-Voltage Overhead Transmission Lines on Sales Prices and Market Values of Nearby Real Estate: An Annotated Bibliography and Evaluative Analysis*. Prepared for Central Maine Power Company by The Real Estate Counseling Group of Connecticut, Inc. September.

Kinnard, W., M. Geckler, and J. DeLottie. 1997. *Post-1992 Evidence Of EMF Impacts On Nearby Residential Property Values. Price Effects from Publication of and Widespread Publicity About the Floderus and Ahlborn-Feychting Studies in Sweden*. A Paper Presented at the 1997 Annual Conference American Real Estate Society. Sarasota, Florida. April 16-19.

Kinnard, W., S. Bond, P. Syms, and J. DeLottie. 1997. *Effects Of Proximity To High Voltage Transmission Lines On Nearby Residential Property Values: An International Perspective On Recent Research*. A Presentation at the 1997 International Conference American Real Estate and Urban Economics Association, University of California at Berkeley, Berkeley, California. May. 1997.

1 studies, and some of the studies that relied on multiple regression analysis, found that
2 transmission lines have an effect on the sales values of nearby single-family residences;
3 generally the effect is not large and ranges from two to ten percent.²¹

4 **Q. Does the presence of high voltage overhead transmission lines on or near a parcel of**
5 **vacant residential land affect the value of that property?**

6 A. In an evaluation of the impacts of transmission lines on the sales prices of vacant residential
7 land in two subdivisions, Blinder found no effect on the value of lots in one subdivision and
8 a negative effect on the value of lots on the other.²² In a study in Maine, Kinnard found that
9 a 345-kV line did not have a statistically significant effect on the sales prices of vacant
10 parcels with potential for development for residential use.²³ A study of vacant land with
11 potential for residential development along the route of the 345-kV Marcy-South line in

Wolverton, M., and S. Bottemiller. 2003. Further analysis of transmission line impact on residential property values. *The Appraisal Journal* July (71 3): 244-252.

²¹ Van Court and Company. 1988. *Real Estate Appraisals: Greenwood-Daniels Park 115/230 KV Conversion--Arapahoe County, Colorado*.

Ignelzi, P., and T. Priestley. 1991. *A Statistical Analysis of Transmission Line Impacts on Residential Property Values in Six Neighborhoods*. Final Report Prepared for Pacific Consulting Services, Albany, CA, 110 pp.

Hamilton, S., and G. Schwann. 1995. Do high voltage electric transmission lines affect property value? *Land Economics* 71 (4): 436-44.

Chalmers, James A. and Frank Voorvart. 2009. High Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects. *The Appraisal Journal*. Summer, 2009. Pp 227-245.

²² Blinder, Calvin L. 1981. "The effect of high voltage overhead transmission lines on residential property value," in Tillman, R. E, ed. *Environmental Concerns in Rights of Way Management*, Proceedings of Second Symposium Held October 16-18, 1979. Palo Alto: Electric Power Research Institute.

²³ Kinnard, William N. Jr. 1988. *The Effect of High-Voltage Overhead Transmission Lines on Sales Prices and Market Values of Nearby Real Estate: An Annotated Bibliography and Evaluative Analysis*. Prepared for Central Maine Power Company by The Real Estate Counseling Group of Connecticut, Inc. September.

1 New York State by Kinnard and Mitchell found that the construction of the transmission line
2 did not have a significant effect on the sales value of these properties.²⁴

3 **Q. Does the presence of high voltage overhead transmission lines on agricultural land**
4 **typically affect the value of that property?**

5 A. No. The effect of transmission lines on the sales prices of agricultural properties has
6 received less attention than transmission line effects on single family residences. However,
7 of the eight or so major studies regarding the effects of transmission lines on the sales prices
8 of agricultural lands, approximately half have found that the transmission lines crossing the
9 parcels sold did not have a statistically significant effect on the selling price.²⁵ Other studies
10 found some level of effect. For example, in a study of agricultural sales in Arizona, Thomas
11 A. Ball found a decrease in sales price of two percent.²⁶ In a study of high voltage lines in
12 agricultural areas in Ontario, Woods Gordon found no effects in two out of the six areas

²⁴ Kinnard, William N. Jr., and Philip S. Mitchell. 1988. *Effects of Proximity to Marcy South Transmission Line Right of Way on Vacant Land Sales: Towns of Hamptonburgh and Wawayanda, Orange County, New York, January 1983 - December 1987*. Storrs, Connecticut: Real Estate Counseling Group of Connecticut. May.

Mitchell, P. and W. Kinnard. 1996. Statistical analysis of high-voltage overhead transmission line construction on the value of vacant land. *Valuation* June: 23-29.

²⁵ Brown, Dean J.A. 1976. The effect of power line structures and easements on farm land values. *Right of Way* December 1975 - January 1976: 33-38.

Weber, William V. and Glenn A. Jensen. 1978. *A Study of High Voltage Power Line Easements and their Effect on Farm Land Values in West Central Minnesota*. Luverne, Minnesota: Jensen Management Service.

Jackson, Thomas. 2010. Electric Transmission Lines: Is There an Impact on Rural Land Values? *Right of Way*. November/December 2010. Pp. 32-35

Chalmers, James A. 2012. High Voltage Transmission Lines and Rural, Western Real Estate Values. *The Appraisal Journal*. Winter 2012. Pp. 30-45.

²⁶ Ball, Thomas A. 1989. *A Study of the Economic Effects of High Voltage Electrical Transmission Lines on the Market Value of Real Properties*. Prepared for Salt River Project, Phoenix. Tempe. March.

1 studied and positive effects in two of the other areas.²⁷ In the remaining two areas, where
2 there was potential for residential development, there was a negative effect.

3 **Q. Does the distance of a property from a high voltage overhead transmission lines affect**
4 **the impact of the transmission line on property values?**

5 A. Several of the studies that have found transmission lines to affect property values have
6 concluded that the effects are highest in the areas immediately adjacent to the transmission
7 line (such as within 50 feet of the right-of-way) but taper off quickly with distance, for
8 example, disappearing almost entirely after 200 feet.^{28,29}

9 **Q. What work did you complete in relation to providing this testimony?**

10 A. In preparing this testimony, I reviewed the Grain Belt Express project description and maps
11 to familiarize myself with the physical characteristics of the Project's features and their
12 relationship to their landscape setting. Next, I analyzed the rebuttal testimony by Kurt
13 Kielisch and Boyd Harris, and reviewed the schedules accompanying their testimony. In
14 addition, I updated my collection of literature regarding the effects of transmission lines on
15 property values to include the latest published studies. Then, I compared the statements
16 made by these two witnesses in their testimony with the evidence available in the published
17 literature to identify areas in which the statements they make and the conclusions they reach
18 are not supported by empirical evidence.

²⁷ Woods Gordon (Management Consultants). 1981. *Study on the Economic Impact of Electric Transmission Corridors on Rural Property Values: Final Report.*

²⁸ Colwell, Peter F. and Kenneth W. Foley. 1979. Electric Transmission Lines and the Selling Price of Residential Property. *The Appraisal Journal*. October, 1979: 490-499.

²⁹ Hamilton, S. and G. Schwann. 1995. "Do high voltage electric transmission lines affect property value?" *Land Economics* 71 (4): 436-44.

1 **III. ANALYSIS OF THE TESTIMONY OFFERED BY KURT KIELISCH**

2 **Q. Do you agree with the general theme of Mr. Kielisch's rebuttal testimony that high-**
3 **voltage transmission lines ("HVTL") have a uniformly negative impact on property**
4 **values?**

5 A. No. Much of Mr. Kielisch's testimony consists of assertions about a series of issues
6 potentially associated with transmission lines that he alleges would have the potential to
7 decrease the value of agricultural properties. In many cases, the assertions he makes about
8 these issues are not entirely accurate and/or are not well supported. In addition, and most
9 importantly, Mr. Kielisch fails to provide evidence needed to establish the link between
10 these issues and their effects on the actual sales prices of properties.

11 **Q. Do you agree with Mr. Kielisch's statement on page 4 of his rebuttal testimony that**
12 **"[u]nderstanding that perception drives value is the foundation in analyzing the effect**
13 **that electric transmission lines have on property value"?**

14 A. No. This assumption reveals a fundamental flaw in Mr. Kielisch's approach to the
15 establishment of the effects of transmission lines on property values. What counts in the end
16 is not speculation about how people might perceive various issues that could be associated
17 with transmission lines or what they say they think about transmission lines, but their actual
18 behavior. The statistical studies cited above measure that behavior. In this case, the
19 behavior of importance is the price they actually pay when they buy a property crossed by or
20 near a transmission line. Thus, the foundation in analyzing the effect that transmission lines
21 have on property value is documentation of the actual prices that buyers have paid for
22 properties and rigorous analysis of the data on the sales prices and characteristics of those
23 properties to determine whether the presence of a transmission line has affected sales prices,
24 and if so, what the direction and degree of that effect is.

1 Mr. Kielisch's assumption that "perception drives value" places him outside of the
2 mainstream of research on the property value impacts of transmission lines. William
3 Kinnard, one of the pioneers of rigorous research on the property value effects of
4 transmission lines and perhaps the most important contributor to the field, was very clear
5 that although perceptions may explain sales prices, they are not predictors. For example, in
6 their landmark article, "A Primer on Proximity Impact Research: Residential Property
7 Values Near High Voltage Transmission Lines," Kinnard and his colleague Sue Ann Dickey
8 note that "... for identifying and measuring any impact on property, buyers' attitudes and
9 perceptions about the effect of claimed health and safety hazards are the major influences,
10 not the science. Indeed, what really matters is what people do when confronted with a
11 purchase decision, rather than what they say they will do"³⁰

12 This assessment is reinforced by Thomas Jackson and Jennifer Pitts in their recent
13 review of the literature on the effects of transmission lines on property values. Their
14 evaluation is that, "Although adverse perceptions by the market can lead to sales price
15 effects, potential effects may be offset or mitigated by other factors influencing the pricing
16 decisions and this likely accounts for the lack of such findings when the preferences
17 "revealed" in sales data are analyzed."³¹

18 **Q. On pages 4 and 5 of his rebuttal, Mr. Kielisch makes mention of and briefly describes**
19 **Schedule KCK-2, which he characterizes as a literature study. What is your**
20 **assessment of this study?**

³⁰ Kinnard, William., and Sue Ann. Dickey. 1995. A primer on proximity impact research: residential property values near high-voltage transmission lines. *Real Estate Issues* 20 (1): p. 26.

³¹ Jackson, Thomas O. and Jennifer Pitts. 2010. The Effects of Electric Transmission Lines on Property Values: A Literature Review, *Journal of Real Estate Literature*. Vol. 18. No. 2., p. 1.

1 A. Although Mr. Kielisch refers to Schedule KCK-2 as a “literature study,” it is not a study in
2 that it lacks focus and rigor. It does not have a clear analytic framework, a statement of
3 hypotheses for testing, or a set of criteria for determining what evidence is appropriate for
4 testing the hypotheses. Instead, it is a somewhat unfiltered compendium of materials of
5 varying relevance and validity. Much of the material included is anecdotal in nature,
6 consisting of references to news clips related to various transmission line issues, rather than
7 actual studies. Except for the section devoted to some of the literature on transmission line
8 property value effects, most of the “study” presents no clear link from the issues discussed
9 in the news clips to any specific effects on property sales prices. The section of the
10 schedule concerned with property value effects includes a small number of the legitimate
11 peer reviewed studies, but these studies included do not at all represent the range and depth
12 of the available body of research. In some cases, the interpretations of the study findings
13 are appropriate, in others, less so. What is troubling about this section is that the findings
14 of the legitimate studies are woven into a narrative that is not entirely critical and includes
15 material from sources of questionable reliability.

16 **Q. On page 5, Mr. Kielisch describes the results of an internet search that he suggests**
17 **provides an indication of public concerns about transmission lines that would**
18 **“influence the perception that a typical buyer would have regarding HTLVs on a**
19 **property [page 6].” Do you agree with Mr. Kielisch’s research approach and his**
20 **conclusions?**

21 A. I do not. Quite honestly, I am surprised that a professional appraiser would call this internet
22 search exercise “research” and give it any credence. There is nothing scientific about this
23 search or the interpretation that Mr. Kielisch has given to what he has found. Mr. Kielisch
24 has presented no information that would establish the representativeness and validity of the

1 opinions about transmission lines he has found on the internet, and he provides no basis for
2 establishing how and especially if the information that may be randomly available on the
3 internet would affect the price a buyer would pay for a property crossed by or near a
4 transmission line.

5 **Q. On page 6, Mr. Kielisch presents a profile of the agricultural buyer. Do you agree with**
6 **it?**

7 A. No. Mr. Kielisch's profile of the agricultural buyer is based entirely on conjecture. There is
8 no reference to interviews, surveys, or other sources of data that would verify the assertions
9 Mr. Kielisch makes about the concerns of the agricultural land buyer. In particular, there is
10 no way of telling what the relative importance of the characteristics that Mr. Kielisch
11 mentions would be, and more importantly, how much of a role each of the variables he
12 mentions would actually play at the time a decision is made to purchase a specific piece of
13 property. Even if the list of variables Mr. Kielisch presents were valid, these factors might
14 in the end have little actual influence on the decisions made and prices paid regarding
15 purchase of agricultural properties crossed by or near transmission lines. As the research
16 previously described that compares perceptions and attitudes concerning transmission lines
17 with the actual sales prices of properties crossed by or in proximity to them has found,
18 concerns about transmission lines that are stated in the abstract may well have little
19 influence on the final decision to purchase a property crossed by or near a line.

20 **Q. On pages 7 through 16, Mr. Kielisch describes a range of concerns about EMF and the**
21 **relationship between a transmission line on an agricultural property and agricultural**
22 **activities. Does Mr. Kielisch present any evidence that directly links these concerns to**
23 **effects on property sales prices?**

24 A. No, he does not.

1 **Q. On page 18. Mr. Kielisch states that the comparable sales method is the best way to**
2 **measure the impact of HVTLs on property values. Do you agree?**

3 A. No. As I explained in my overview of the research on the property value impacts of
4 transmission lines, the earliest studies of the effects of transmission on property values were
5 conducted by appraisers who used the comparable sales (i.e. paired sales) analysis method,
6 the traditional tool of the appraisal profession. In reviewing the evolution of research on the
7 property value impacts of transmission lines, William Kinnard observed that the early
8 studies were, with a few exceptions, “nonsystematic and nonscientific” and that:

9 They were not designed to allow for statistical testing of the results for significance
10 and reliability. They generally provide simple comparisons of either pairs or lists of
11 sales prices with the accompanying assertion that the properties are similar. They
12 tend to be descriptive, observational, or anecdotal, without any subsequent analysis
13 of the material provided in the report.³²

14 A specific limitation of the comparable sales approach is that it is often difficult to
15 find many sets of two sales of comparable property, one crossed by or close to a
16 transmission corridor and the other located in an area where there is no transmission line to
17 use as the basis for analysis. Another significant limitation is that a great deal of subjectivity
18 is involved in the comparable sales approach, whereas an analysis based upon multiple
19 regression minimizes that subjectivity.

20 Although the comparable sales methodology may meet the specific needs of the
21 appraisal profession, the method does not lend itself to establishing what the effects of
22 facilities like transmission lines are on the properties that they cross or are in their vicinity.

³² Kinnard, William. 1990. The Impact of High Voltage Transmission Lines on Real Estate Values. 1990. *Journal of Property Tax Management*. Vol. 1, No. 4. P. 45.

1 In support of this point, William Kinnard observed that "... the measurement of market
2 impacts on levels of values (or prices) is not simply the sum of a large number of individual
3 appraisals."³³

4 Starting in the 1970s, the comparable sales approach has been increasingly displaced
5 by use of the more rigorous and statistically powerful hedonic modeling study approach.
6 For some time, the hedonic modeling study approach has been the preferred methodology
7 for property value impact studies.³⁴

8 **Q. On pages 21-25, Mr. Kielisch provides summaries of five transmission line property**
9 **value impact studies he has conducted as well as an appraisal for a property crossed by**
10 **a transmission line and another for which a transmission line crossing has been**
11 **proposed. Do these studies provide an adequate basis for establishing what the**
12 **property value impacts of the Grain Belt Express transmission line would be?**

13 **A.** No. The five studies of sales of agricultural land that Mr. Kielisch conducted in Wisconsin,
14 Indiana, and Kansas, all entailed paired sales comparisons. I have already described the
15 limitations of the paired sales analysis approach and the reasons why this kind of analysis is
16 not the preferred method for establishing the property value effects of transmission lines.
17 The specifics of the studies Mr. Kielisch describes illustrate the shortcomings of the paired
18 sales approach which have led to it being found as inadequate for establishing transmission
19 line property value effects. For example, the descriptions of the studies do not include a

³³ Kinnard, William. 1990. The Impact of High Voltage Transmission Lines on Real Estate Values. 1990. *Journal of Property Tax Management*. Vol. 1, No. 4. P. 45.

³⁴ See Boyle, M., and K. Kiel. 2001. A survey of house price hedonic studies of the impact of environmental externalities. *Journal of Real Estate Literature* 9 (2): 117-144. and Kinnard, W., and S. Dickey. 1995. A primer on proximity impact research: residential property values near high-voltage transmission lines. *Real Estate Issues* 20 (1): p. 25.

1 reference to the protocols and criteria that were used to ensure that all the on-line and off-
2 line properties used in each study were entirely comparable in terms of location; parcel size;
3 percentage of land devoted to forest, wetland, grazing, orchard, row crops, and field crops;
4 soils; drainage; and improvements. In addition, there is no description of any criteria or
5 methods that were used to adjust the data to account for differences of this kind between the
6 properties. As a consequence, it is not at all verifiable whether the impacts to property value
7 that Mr. Kielisch attributes to the presence of a transmission line are related to the
8 transmission line or to some other variable. As an example of the reasons for this concern,
9 the description of the study in the Town of Hendren in Clark County raises red flags. The
10 land included in the study is referred to as “agricultural and recreation land.” This raises
11 many questions. For example, is the mix of agricultural and recreational land on each of the
12 properties the same? Is the nature and quality of the agricultural and recreational lands on
13 each of the properties comparable? A major concern about the Hendren study and the four
14 other studies is that the samples are very small, with the Hendren study entailing analysis of
15 only 22 properties, of which only 4 are crossed by a transmission line. The number of
16 properties used as the basis for the other studies ranges from 14 to 32. These samples are
17 very small, and do not provide for a level of confidence in the generalizability of the results.
18 In contrast, the published, statistical studies described above use many hundreds of sales.
19 An additional and fatal flaw of all of these analyses is that the analyses were performed
20 using only rudimentary, descriptive statistics, and there has been no analysis of the statistical
21 significance of the findings. Given the limitations of these studies, it is not surprising, as
22 verified by Mr. Kielisch, that these studies have not been published. Because of the serious
23 methodological and analytic shortcomings of these five studies, they cannot be accepted as

1 evidence of whether and by how much a transmission line would affect the sales price of an
2 agricultural property.

3 The two appraisals that Mr. Kielisch describes have to be taken as anecdotal at best.
4 In both cases, the appraisals are not described in sufficient detail to provide any confidence
5 in the validity of the findings. In addition, the sample sizes used in conducting these
6 appraisals is so small that there is no basis for statistical testing of the findings and no basis
7 for making generalizations based on the results.

8 **Q. On page 26, Mr. Kielisch makes mention of the Chalmers study of property value
9 impacts in Montana.³⁵ Do you agree with his comments related to the Chalmers study?**

10 **A.** For the most part, no. Mr. Kielisch declares this study not applicable because the lands
11 evaluated in the study included low grade pasture lands, and that many of the agricultural
12 lands also included recreational land use. He was also concerned about the use of a mixture
13 of questionnaire and sales data. Mr. Kielisch's dismissal of this study was too hasty. Close
14 reading of this study reveals that it is a model of careful, thoughtful research that in a very
15 systematic way develops a framework for understanding the relationship between large
16 transmission lines and a range of kinds of properties and the potential for the transmission
17 lines to affect the sales values of those properties. Mr. Kielisch is correct in saying that
18 Chalmers "... found no conclusive evidence that HVTLs had a measurable negative impact
19 these lands" (i.e. agricultural lands). It should be noted that Chalmers also found that when
20 there were recreational uses on an agricultural property, that "... the effects of increasing
21 recreational influence are not what might be expected" because there are other variables at

³⁵ Chalmers, James A. 2012. High Voltage Transmission Lines and Rural, Western Real Estate Values. The Appraisal Journal. Winter 2012. Pp. 30-45.

1 work that tend to dilute the transmission line's effect.³⁶ Mr. Kielisch's mention that the
2 Chalmers report includes findings of sizable losses to property value that typically range
3 from 20-30% and go up to 50% is a mischaracterization of the study's findings. In brief,
4 what Chalmers found was that on production agricultural lands (a category that includes
5 both cropland and range lands) there was no evidence supporting a transmission line effect
6 on sales price. For agricultural lands with recreational influence (e.g. having a high level of
7 environmental amenity) and agricultural lands with high amenity recreation and natural
8 features (e.g. having a river or trout stream, a historic character, or spectacular views), there
9 was also no evidence of a transmission line effect on sales price. There was also no
10 evidence of a price effect on sales of large acreage rural residential tracts (ranging from 60
11 acres to 591 acres in size) or of recreational tracts and cabin sites. For half of the small lot
12 rural residential subdivisions, no transmission line price effect was found. However, in the
13 others, some level of effect was observed. The property loss figures that Mr. Kielisch cites
14 are observations made about losses to a very limited number of individual small parcels
15 abutting or encumbered by a transmission line and are not reflective of the Chalmers study's
16 overall findings about transmission line effects on residential properties.³⁷

17 **Q. On page 26, Mr. Kielisch makes mention of a study by Thomas Jackson on the impacts**
18 **of transmission lines on agricultural properties.³⁸ Do you agree with his comments**
19 **related to the Jackson study?**

³⁶ Chalmers, James A. 2012. High Voltage Transmission Lines and Rural, Western Real Estate Values. The Appraisal Journal. Winter 2012. Pp. 42-44.

³⁷ Chalmers, James A. 2012. High Voltage Transmission Lines and Rural, Western Real Estate Values. The Appraisal Journal. Winter 2012. P. 40.

³⁸ Jackson, Thomas. 2010. Electric Transmission Lines: Is There an Impact on Rural Land Values? *Right of Way*. November/December 2010. Pp. 32-35

1 A. No. The Jackson study that Mr. Kielisch is referring to is a study by Dr. Thomas Jackson, a
2 Professor of Real Estate at Texas A&M and the president of a real estate research firm. This
3 study used a hedonic modeling approach to analyze 381 sales of agricultural properties in
4 Wisconsin: 88 of the sales were online, and 297 offline. Two models were used to model
5 the data. One of the models had a total of 18 independent variables, and the other had 15.
6 This study found that the presence of a transmission line on an agricultural property had a
7 small effect on the parcel's sales price, reducing it by 1.11% to 2.44%. However, these
8 effects were not found to be statistically significant.

9 Mr. Kielisch declares that the Jackson study is flawed, listing a series of property
10 characteristics that he feels were not properly accounted for in the analysis. Mr. Kielisch's
11 criticisms of the Jackson study mirrors many of the criticisms of the study made by John
12 Schmick in a rebuttal piece that was published in *Right of Way* in March/April 2011 a few
13 months after the Jackson study was published in the same journal.³⁹ In the May/June 2011
14 issue of *Right of Way*, Thomas Jackson published a response to John Schmick's criticisms
15 that convincingly explained his study design, procedures, and analytic approach and how
16 they had in fact accounted for the issues about which Mr. Schmick had expressed concern.⁴⁰

17 The issues that Mr. Kielisch raises about the Jackson study are successfully dealt
18 with in Jackson's May/June 2011 *Right of Way* response piece. In brief, the variables that
19 Mr. Kielisch is concerned are not accounted for in the study are in fact taken into account in
20 the model, and the sales included in the analysis were selected in a systematic and
21 evenhanded manner. It appears that Mr. Kielisch's concerns about the Jackson analysis,

³⁹ Schmick, John. 2011. A Rebuttal: Electric Transmission Lines: Is There an Impact on Rural Land Values? *Right of Way*. March/April 2011. Pp. 30-31.

⁴⁰ Jackson, Thomas. 2011. Electric Transmission Lines and Rural Land Values: A Closer Look. *Right of Way*. May/June 2011. Pp. 35-37.

1 like those of John Schnick, may stem from the fact that they are both appraisers, a
2 professional group that has a set of ideas about and methods for conducting property
3 analyses that differ in some important ways from those used by the more academic
4 researchers in the hedonic modeling tradition, whose study designs and analyses entail use
5 of large samples of sales and powerful statistical tools.

6 In any case, I disagree with Mr. Kielisch's criticism of the Jackson study and his
7 assertion that he does not feel that it "... legitimately represents the actions of a buyer of
8 agricultural lands when encumbered with a HVTL." (p.27). As a consequence, my opinion
9 is that Jackson's finding is legitimate that any effect of a transmission line on the value of
10 the properties he studied is likely to be very small, in the vicinity of ~~0.11%~~ 1.11% to 2.44%, and
11 not statistically significant.

12 **IV. ANALYSIS OF THE REBUTTAL TESTIMONY OF BOYD L. HARRIS ON**
13 **BEHALF OF MATTHEW AND CHRISTINA REICHERT**

14 **Q. On page 2, Mr. Harris specifies two ways that the proposed power line easement will,**
15 **in his opinion, significantly impact his clients' real estate. What is your response?**

16 **A.** Mr. Harris's stated opinion is that the proposed power line easement will impact his clients'
17 real estate through loss of income and productivity from the crop land and a lack of demand
18 or use on the bread and breakfast. Both claims are sweeping assertions and absolutely no
19 concrete evidence is provided to demonstrate how the proposed transmission line would
20 create the effects that are alleged, to specify the specific nature and magnitude of the effects,
21 and most importantly, to relate those effects to the property's sales value.

22 **Q. On page 3, Mr. Harris describes efforts to sell rural residential lots on a parcel in**
23 **Randolph County, Missouri. Does this example support his claims related to the**
24 **impacts he asserts that the Grain Belt Express project would have on his clients'**
25 **property.**

1 A. No. The example that Mr. Harris provides is an anecdote, but not evidence. What he
2 describes is a single case that entails a property and situation that is completely different
3 from that of his clients. This sketch of a story about this ill-timed rural residential
4 subdivision doesn't prove anything. There are many reasons why this subdivision may have
5 failed, and Mr. Harris presents no evidence to tie down what they were. This anecdote has
6 no relevance the question of the potential effects of the Grain Belt Express on his clients'
7 property. Mr. Harris' statement that "Our real life example is significantly better than any of
8 the studies" (p.4) is clearly not valid.

9 **Q. On page 4, Mr. Harris makes reference to white papers shared with him by his**
10 **colleagues that find sales that have been adversely impacted by transmission lines.**
11 **What is your response?**

12 A. This is hearsay, not evidence. For the assertions Mr. Harris makes about what he has seen in
13 these white paper to be considered as evidence, the white papers need to be made available
14 to all participating in this proceeding so that they can be carefully scrutinized and the
15 validity and relevance of the data established.

16 **Q. On page 6, Mr. Harris makes reference to a newspaper article from the New**
17 **Hampshire Union leader about a property that would be affected by the Northern Pass**
18 **Transmission Line. What is your response?**

19 A. The newspaper article by reporter Paula Tracy of the New Hampshire Union Leader that
20 appeared in April, 2011, describes the situation of the owners of a 135 acre property in
21 Northern New Hampshire that had the potential to be crossed by one of the alternative routes
22 being considered by the Northern Pass transmission line project.⁴¹ Ms. Tracy reports on the

⁴¹ Tracy, Paula. 2011. Northern Pass Kills land Value. New Hampshire Union Leader. April 25, 2011.

1 results of an appraisal that the owners of this property had prepared that predicted a
2 substantial drop in the value of their property. This article is anecdotal, and involves just
3 one property that is in an environmental setting and circumstances that are very different
4 from those of the property of Mr. Boyd's clients. Furthermore, and most significantly, what
5 the article reports is not an actual property sale, but the results of an appraisal, whose
6 accuracy would be very hard to judge. This newspaper article does not constitute evidence
7 that is either valid or relevant.

8 **Q. Does this conclude your prepared direct testimony?**

9 **A. Yes, it does.**

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

In the Matter of the Application of Grain Belt)
Express Clean Line LLC for a Certificate of)
Convenience and Necessity Authorizing it to) Case No. EA-2014-0207
Construct, Own, Operate, Control, Manage and)
Maintain a High Voltage, Direct Current)
Transmission Line and an Associated Converter)
Station Providing an Interconnection on the)
Maywood 345 kV transmission line.)

AFFIDAVIT OF THOMAS PRIESTLEY, PH.D.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

Thomas Priestley, Ph.D., being first duly sworn on his oath, states:

1. My name is Thomas Priestley. I am a Senior Environmental Planner with CH2M HILL.
2. Attached hereto and made a part hereof for all purposes is my Surrebuttal Testimony on behalf of Grain Belt Express Clean Line, LLC consisting of 25 pages, having been prepared in written form for introduction into evidence in the above-captioned docket.
3. I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.



Thomas J. Priestley

Thomas Priestley

Subscribed and sworn to before me this 14th day of October, 2014.

Jesse LaRue

Notary Public

My Commission Expires: 8-25-18



1000 Wilshire Boulevard, Suite 2100
Los Angeles, CA 90017

Thomas Priestley, Ph.D.

Senior Environmental Planner

Education

Ph.D., Environmental Planning, University of California, Berkeley, 1988

M.C.P., City Planning, University of California, Berkeley, 1976

M.L.A., Environmental University of California, Berkeley, 1974

B.U.P., Urban Planning, University of Illinois, Urbana, 1969

Professional Affiliations

American Institute of Certified Planners (Certified Planner No. 008919)

American Planning Association

American Society of Landscape Architects

Relevant Experience

Dr. Priestley is a Senior Environmental Planner based in CH2M HILL's Los Angeles, California, office, and serves as the leader of the firm's visual resources practice group. In this role, Dr. Priestley guides the company's visual resources work through issue scoping, development of study designs, mobilization of staff and technologies appropriate to the assignment, guidance of analysis activities, and senior review of final products. In addition, Dr. Priestley consults directly in cases that require special visual resources and property value impact expertise and he provides expert witness testimony when required.

Dr. Priestley has more than 30 years of professional experience in urban and environmental planning and visual resource assessment. He is known nationwide for his expertise in evaluating aesthetic, land use, property value, and public acceptance issues related to electric energy projects. His experience includes projecting community land use development trends to determine facility needs and optimal location, assessing land use and visual effects of proposed electric facilities, documenting and evaluating design measures to integrate electric facilities into their visual settings, conducting studies of public perceptions of transmission line visual effects, and contributing to studies of electric facility impacts on property values. Through his project experience and research conducted for utility clients, Dr. Priestley has developed expertise in methods used for siting electric generation, transmission, and substation facilities and mitigating their land use, aesthetic, and other environmental effects. As editor or co-author, he has made major contributions to Edison Electric Institute publications related to understanding and evaluating the environmental and property value effects of electric facilities.

Representative Projects and Dates of Involvement

Projects Related to Electric Facility Property Value Effects

Mariposa Energy Project; Alameda County, California. Analysis and Expert Witness Testimony on Property Value Impacts. 2010–2011. Evaluated the potential effects of the proposed Mariposa Energy Project gas-fired power plant on property values in the Mountain House residential development located two miles away. Prepared an analysis report, and provided written and oral testimony on the project's potential property value impacts to the California Energy Commission.

Thomas Priestley, Ph.D.

Montana Department of Environmental Quality; Mountain States Transmission Intertie (MSTI) Project; Montana and Idaho. Assessment of Potential for Property Value Impacts. 2009–2011. Conducted a review of recent research on the property value impacts of high-voltage transmission lines. Based on this and previous research reviews, prepared report that summarized this research and its key findings to provide a context for understanding the potential implications of the proposed 500-kV MSTI line on property values. In addition, provided a detailed review of a study of the impacts of high-voltage transmission lines on Montana real estate values sponsored by the project developer and participated in a workshop on transmission line property value impact issues in Montana.

New York Regional Interconnect Project (NYRI); New York State. Analysis and Expert Witness Testimony on Property Value Impacts. 2008–2009. For the NYRI project, designed and implemented an analysis of the potential effects of a 400-kV DC transmission line proposed to extend from Utica to Middletown on property values and tourism and the tourist economy in the communities through which it would be routed. Prepared technical reports and provided written and oral expert witness testimony on property value impacts to the New York Public Service Commission.

Lawrence Berkeley Laboratory Study of Wind Power Project Impacts on Residential Property Values. 2006–2009. Provided research guidance and technical advice to a study that used hedonic modeling to evaluate 7,459 sales of residences in the vicinity of wind power projects in the U.S. to assess the impacts of these projects on sales prices. Drawing on previous experience in conducting research on transmission line perceptions and property value effects, played a role in the development of variables to capture view quality and the impacts of the wind farms on views.

Dominion Technical Solutions; Richmond, Virginia. Expert Witness Testimony on Transmission Lines and Property Values. 2005. Prepared expert witness testimony on transmission line property value effects for presentation to the Emerging Technology Issues Advisory Committee of the Virginia General Assembly Joint Commission on Technology and Science. The testimony included a written report that reviewed and summarized the results of a comprehensive search and evaluation of the published literature documenting empirical research on the relationships between transmission lines and the sales prices of nearby properties. This report updated the literature review prepared for EEI in 1992 to incorporate the literature published between 1990 and 2005.

Sacramento Electric Utility District, El Dorado County, California. Upper American River Project Property Value Impact Assessment. 2004–2005. Task lead for the assessment of the potential impacts of a pumped storage facility and an associated transmission line and road improvement project on the sales values of privately owned properties. The approach included mapping of the facilities and privately owned lots in proximity to them, identification of visual and other project-related effects potentially having an impact on those lots, and review and application of the findings of the relevant property value impact research literature.

Sutter Power Project; Sutter County, California. Analysis of Transmission Line and Switching Station Effects on Agriculture and Land Use. 1998. In response to a request by one of the California Energy Commissioners hearing the licensing case, prepared an analysis of the potential effects of the transmission line and switching station associated with the proposed Sutter Power Project on the local agricultural economy and the value of agricultural property along the transmission line route. The analysis included a systematic review of the impact of the occupancy of land by the transmission structures, the increased time and costs in using ground and aerial equipment around the structures, and any reductions in yields these conditions would bring about.

Edison Electric Institute. Review of the Literature on Transmission Line Effects on Property Values. 1992. With Cynthia Kroll, co-author of an Edison Electric Institute-sponsored bibliography and critical review of

studies on the relationships between transmission lines and the property values that were published between 1975 and 1990.

Guide to Conducting Research on Transmission Line Property Value and Aesthetic Effects. 1991. Co-author of an Edison Electric Institute guidebook for utility staff on the design and implementation of research on the effects of electric transmission lines on perceptions and property values in residential neighborhoods. Co-authored and assisted in the production of an accompanying videotape.

Pacific Consulting Services, Albany, California. Study of Transmission Line Effects on Property Values. 1989–1991. Consultant and major contributor to the design and implementation of a research project sponsored by Southern California Edison that used hedonic modeling to analyze over 950 sales to evaluate the property value effects of transmission lines in a cross section of suburban residential neighborhoods.

Electric Transmission Lines

Southline Transmission Project; Arizona and New Mexico. 2011-2013. Senior technical lead for the analysis of potential visual impacts from construction of a proposed new 345-kilovolt double-circuit transmission line (approximately 205 miles between New Mexico and Arizona) and upgrade of existing transmission line (approximately 120 miles in Arizona). Coordinated with Bureau of Land Management staff regarding design and implementation of the analysis to assure consistency with BLM Visual Resource Management system requirements. Directed the efforts of the CH2M HILL team in initial coordination with BLM staff, including conducting field work, documenting and selecting viewpoints for analysis, preparing visual simulations, analyzing impacts using BLM VRM worksheets, reviewing analysis results with BLM staff, and documenting the analysis in a technical report.

Mountain States Transmission Intertie Project; Montana and Idaho. 2008–20012. Technical lead for the visual resources impact and property value impact assessments of a 400-mile, 500 kV transmission line being proposed by Northwest Power. The client for the analysis was the Montana Department of Environmental Quality and the assessment was designed to fulfill the analytic requirements of the DEQ, the US Forest Service and the US Bureau of Land Management. As the technical lead for this task, designed the analysis strategy and directing its implementation by a team that included CH2M HILL staff and other team partners.

Southern California Edison; Eldorado to Ivanpah 220-kV Transmission Line, Proponent's Environmental Assessment; San Bernardino County, California, and Clark County, Nevada. 2009-2010. Provided senior guidance and review for the preparation of the Proponent's Environmental Assessment (PEA) visual resources impact analysis of a proposal by SCE to develop a new 36-mile, 220-kV transmission line between the Eldorado Substation and a new Ivanpah Substation located in eastern San Bernardino County, California, 7 miles southwest of Primm, Nevada.

Saguaro to North Loop Transmission Line Project; Pinal and Pima Counties, Arizona. 2009. Supervised the visual impact analysis of a 14-mile, 138 kV, four-circuit transmission line proposed by Tucson Electric Power. The route travels through an open and complexly vegetated desert landscape, passing close to several areas of residential development. The visual analysis was designed to meet the requirements of the Arizona Corporation Commission Power Plant and Transmission Line Siting Committee.

Tehachapi Renewables Transmission Project; Southern California. 2006–2009. Technical lead for the analysis of the visual impacts of a 190-mile, 500 kV transmission line proposed by Southern California Edison. The route traverses a diverse and complex set of landscapes that include open lands in the Antelope Valley, National Forest lands in the San Gabriel Mountains valued for their recreational and scenic importance, and highly developed urban areas in the San Gabriel Valley. Designed the analysis strategy that was implemented by a team of five CH2M HILL visual resource specialists who were supported by CH2M HILL planners and GIS, visual simulation, graphics, and report production staff.

Thomas Priestley, Ph.D.

Southern California Edison; Antelope-Pardee 500-kV and Antelope Segments 2 and 3 Transmission Projects; Los Angeles County, California. 2006–2007. Assisted SCE in responding to controversial project visual impact issues and proposed visual impact mitigation requirements associated with these two 500 kV transmission line projects. Reviewed and critiqued the visual resource impact analysis prepared by the CPUC's visual consultant, conducted focused analyses of visual issues on which there was disagreement with the CPUC consultant's conclusions, prepared written reports for filing with the CPUC, and participated in working sessions with CPUC and US Forest Service visual resources staff to resolve issues.

Jefferson-Martin Transmission Project, Proponent's Environmental Assessment; San Mateo County, California. Senior reviewer and consultant for an analysis of the aesthetic issues associated with the proposed replacement of a 14.7-mile segment of an existing transmission line with a 230 kV line on larger towers. The transmission line's location in an open space area prized for its scenic qualities and in proximity to affluent residential areas made the visual issues a sensitive and critical dimension of this project, requiring an intensive degree of analysis. Contributed to a detailed critique of the PUC's conclusions regarding project aesthetic effects. Prepared written expert witness testimony.

Kangley-Echo Lake Transmission Line; King and Kittitas Counties, Washington. 2003-2004. Scoped the visual issues and designed and implemented an analysis plan to assess the potential aesthetic impacts of a proposed 500 kV transmission line on four alternative routes, with a total length of approximately 120 miles through forest, recreation, scenic corridor, and rural and suburban residential areas. Supervised the preparation of photo simulations and the preparation of GIS analyses. Prepared the technical report documenting the analysis.

Tri-Valley Transmission Upgrade Project Proponent's Environmental Assessment; Alameda County, California. Analyzed aesthetic issues associated with a system of new 230 kV lines and substations being proposed by Pacific Gas and Electric Company to upgrade service to the Livermore/Pleasanton/San Ramon area. Scoped issues and made an evaluation of a large set of candidate routes to aid selection of a smaller set of preferred routes. Conducted detailed visual analyses of the preferred routes, wrote the draft of the visual analysis report, and proposed mitigation measures in preparation for filing of a permit application with the California Public Utilities Commission.

Valley-Auld Transmission Line Proponent's Environmental Assessment; Riverside County, California. Scoped visual issues associated with a proposed 12-mile, 115 kV Southern California Edison transmission line, conducted visual analyses, prepared the visual analysis report, and proposed mitigation measures to reduce project's visual effects to less-than-significant levels in preparation for filing of a permit application with the California Public Utilities Commission.

Swan Lake/Lake Tye Transmission Project; Tongass National Forest, Alaska. Prepared the visual section of the Environmental Impact Statement for a 60-mile transmission line and associated access roads proposed by Ketchikan Public Utilities for Forest Service lands in Alaska's southeast peninsula. Coordinated with Forest Service planning and visual resource management specialists; reviewed Forest Service Visual Resource Management analyses and policies for the project area; analyzed existing landscape conditions; evaluated the aesthetic effects of similar facilities that already exist in the region; provided advice about siting of the route alternatives; analyzed the visual effects of the alternatives; and developed mitigation strategies.

Geothermal Public Powerline; Lake and Colusa Counties, California. Consultant to the California Energy Commission for evaluation of the aesthetic impacts of a transmission line proposed to link the Geysers geothermal area and the Central Valley. Inventoried landscape conditions and reviewed the project proponent's visual impact assessments. Developed independent evaluations of the project's effects on landscape quality in developed communities, in resort areas, along scenic highway corridors, and in other sensitive areas; proposed mitigation measures.

Colusa County Transmission Line Element; Colusa County, California. Consultant to a team that developed an element for the Colusa County General Plan to guide the siting and design of new electric transmission lines. Summarized the literature on transmission line effects and on siting and design options for impact mitigation, developed an analysis framework, provided technical review of all final products, and prepared the chapter on aesthetic issues. The aesthetic work included survey and evaluation of the county's current landscape conditions and sensitivities, and development of siting and design guidelines.

International Electric Transmission Perception Project. Project Manager for a multi-year research program sponsored by Hydro-Québec, Electricité de France, BC Hydro, the Bonneville Power Administration, and Southern California Edison. Managed a team of planners and social scientists conducting research aimed at development and application of standardized methods for surveying the public's perceptions of the impacts of high-voltage transmission lines. Identified transmission line siting issues and information needs, summarized and evaluated existing research findings, participated in development of a conceptual framework for understanding the public's perceptions, and contributed to the development of a master plan and design for preparation and testing of standardized survey instruments.

Development of a New Method for Considering Aesthetic Issues in Transmission Line Siting, Québec, Canada. For Hydro-Québec, provided conceptual review and research assistance for its efforts to evaluate and revise approaches to treatment of transmission line aesthetic issues in project planning, siting, and design.

Environmentally Sensitive Design of Transmission and Substation Equipment. For Hydro-Québec and Electricité de France, developed an inventory and assessment of the experience of U.S. utilities in developing new transmission and substation equipment designs to reduce aesthetic and other environmental impacts. Activities included literature review, survey of utility engineers and planners, interviews with utility personnel, and documentation and synthesis of findings.

Review of New Design for 500 kV Towers, British Columbia, Canada. Aesthetics specialist on a panel of experts convened by BC Hydro to review a new design for 500 kV transmission towers.

Design Solutions for Mitigation of Substation Impacts. For Hydro-Québec, documented the experience of utilities in the U.S., Canada, France, and Japan in developing design solutions intended to integrate urban substations into their settings. In addition, documented measures used by U.S. utilities to respond to environmental issues associated with modifications of existing substations.

Study of Public Perceptions of a Transmission Line in a Residential Neighborhood; Vallejo, California. Designed and conducted a survey of resident perceptions of a newly upgraded 115/230 kV transmission line in a neighborhood of single-family homes. Conducted advanced analysis and interpretation of the findings. Published the results as a research report and journal article.

Transmission Line Undergrounding and Under River Crossings. For Hydro Québec, conducted a set of case studies documenting and analyzing controversies over the siting of electric transmission lines in which demands were made for placing lines underground or under water.

Transmission Line Effects on Land Use Development. For the Edison Electric Institute, identified and evaluated transmission line siting cases in which concerns about line impacts on future development were a major concern. Reviewed the literature on transmission line impacts on land use development and proposed a program for further research.

Transmission Line Land Use and Aesthetic Issues. For Pacific Gas and Electric Company, analyzed land use and aesthetic issues associated with transmission lines and prepared policy papers for submission to the California Public Utilities Commission.

Wind Generation Facilities

Thomas Priestley, Ph.D.

Iberdrola Renewables; Blue Creek Wind Farm; Van Wert and Paulding Counties, Ohio. To meet the requirements of the Ohio Power Siting Board permit application process, designed and prepared the analysis of the potential aesthetic effects of a proposal to develop a 167 turbine wind farm and 115 kV transmission line in an agricultural area in northwest Ohio. Issues evaluated included the project's potential impacts on views from nearby residences, communities, and travel routes. Oversaw the analysis of the project's potential shadow flicker impacts and prepared the shadow flicker analysis report.

Iberdrola Renewables; Cayuga Ridge Wind Farm; Livingston County, Illinois. Supervised the site field work and preparation of simulations for this 300-MW wind farm proposed for development by in an agricultural area near Streator. Oversaw the analysis of the project's potential shadow flicker impacts and prepared the shadow flicker analysis report.

Air Force Center for Engineering and the Environment; Visual Analysis of Proposed Wind Turbine Development at the Massachusetts Military Reservation; Bourne, Massachusetts. Designed and directed the analysis of the potential aesthetic effects of a proposal to develop a single 1.65-MW wind turbine on the crest of a glacial moraine at the Massachusetts Military Reservation on Cape Cod. This analysis included an innovative use of GIS tools and data to develop mapping of potential turbine visibility that took into account the role of vegetation and distance in reducing potential turbine visibility and visual effects. This mapped analysis was used as a basis for assessing potential project visual effects on sensitive viewers and on views from the many historic sites in the project area. This analytic mapping, supplemented with photo documentation of views from sensitive areas, was incorporated into visual resource reports that responded to the requirements of the National Environmental Policy Act and of the Massachusetts Historical Commission.

Terra-Gen Power, LLC; Alta East Wind Project; Kern County, California. Senior consultant for a study of a proposed 300-MW wind energy project (up to 120 wind turbine generators within an approximately 3,700-acre site). Project site is located in the eastern Tehachapis, west of Mojave, on private and BLM-managed land. Analyses, including zone of visual influence (ZVI) mapping and visual simulations, were used in the technical report prepared to accompany both the Bureau of Land Management Plan of Development and County applications and to support County development of an Environmental Impact Report.

NextEra Energy Resources; North Sky River Project; Kern County, California. Senior consultant for a study of the visual effects of a proposed wind energy project on BLM and private lands in the southern Sierra Nevada, 15 miles north northwest of Mojave. Analyses, including the use of zone of visual influence mapping and visual simulations, were incorporated into a technical report to accompany both BLM Plan of Development and County applications and to support County's development of an Environmental Impact Report.

PacifiCorp; Dunlap Ranch Wind Energy Project; Carbon County, Wyoming. Designed and supervised the analysis of the potential aesthetic effects of a proposal to develop a 111-MW wind farm and 230-kV transmission line on privately owned ranch lands located approximately 7.5 miles north of Medicine Bow. This analysis became the Visual Resources chapter of the project's Environmental Assessment required by the Wyoming State Industrial Siting Act permit process. Provided expert witness testimony before the Wyoming Industrial Siting Board on the project's aesthetic issues.

Duke Energy; Top of the World Windpower Project; Carbon County, Wyoming. Designed and supervised the analysis of the potential aesthetic effects of a proposal to develop a 99-MW wind farm and 230-kV transmission line on privately owned ranch lands located north of Glen Rock. This analysis became the Visual Resources chapter of the project's Environmental Assessment required by the Wyoming State Industrial Siting Act permit process. Special attention was focused on potential visual effects on the nearby community of Rolling Hills.

Horizon Wind Energy; Simpson Ridge Wind Power Project; Carbon County, Wyoming. To meet the requirements of the Wyoming State Industrial Act permit process, designed and supervised the analysis of the potential aesthetic effects of a proposal to develop a 154-turbine wind farm and 230-kV transmission line on ranch lands in the area south of Hanna and Medicine Bow. Issues evaluated included the project's potential impacts on views from nearby communities, historic U.S. Route 30, and the historic Carbon town site and cemetery.

Duke Energy; Campbell Hill Wind Power Project; Converse County, Wyoming. Designed and supervised the analysis of the potential aesthetic effects of a proposal to develop a 100-MW wind farm and 230-kV transmission line on ranch lands in the area north of Glenrock. This analysis became the Visual Resources chapter of the project's Environmental Assessment required by the Wyoming State Industrial Act permit process.

Horizon Wind Energy; Antelope Ridge Wind Farm; Union County, Oregon. Senior task lead for the preparation of Exhibit L (Impacts on Protected Areas) and Exhibit R (Scenic and Aesthetic Values) for the Energy Facility Siting Council permit application for this 300-MW wind farm. Specialized analyses included detailed visibility studies from the City of Union and the Oregon Trail. Prepared materials related to the project's visual issues to support public outreach activities and participated in the project's public information meeting. Prepared simulations to depict the project's appearance, including a simulation to counter a citizen-prepared simulation circulating in the community that grossly misrepresented the project's appearance and visual effects.

Orion Wind Energy; Biglow Canyon Wind Power Project; Sherman County, Oregon. Designed and conducted the analysis of the potential aesthetic effects of a proposal to develop up to 218 1.5-MW turbines in an agricultural area in north central Oregon. Assessed effects on views from scenic, aesthetic, and protected areas defined by the Oregon Energy Facility Siting Council (EFSC). Based on these analyses, prepared Exhibit L (Impacts on Protected Areas) and Exhibit R (Scenic and Aesthetic Values) of the EFSC permit application.

Zilkha Renewable Resources; Kittitas Valley Wind Power Project; Kittitas County, Washington. Designed and conducted the analysis of the potential aesthetic effects of a proposal to develop up to 121 1.3- to 2.5-MW turbines on ridge lands in a rural area in north central Kittitas County. Assessed effects on views from nearby roadways and residences and recommended mitigation measures to attenuate impacts. Prepared the aesthetics chapter for the permit application to the Washington Energy Facility Site Evaluation Council (EFSEC). Provided written and oral expert testimony in hearings before EFSEC. Developed an approach to determine appropriate turbine setbacks from residences that was adopted by EFSEC in its decision and which was validated by the Washington Supreme Court when in response to a legal challenge, it upheld EFSEC's approval of the project.

Zilkha Renewable Resources; Wild Horse Wind Power Project; Kittitas County, Washington. Designed and conducted the analysis of the potential aesthetic effects of a large wind turbine installation proposed for Whiskey Dick Mountain in eastern Kittitas County. Assessed effects on views from nearby roadways and residences and recommended mitigation measures. Prepared the aesthetics chapter for the permit application to the Washington EFSEC. Prepared written expert witness testimony and provided oral testimony before EFSEC.

Solar Generation Facilities

Bright Source Energy; Ivanpah Solar Electric Generating System; San Bernardino County, California. Senior reviewer for the Application for Certification visual resource analysis prepared for a solar thermal project proposed by for development on 3,400 acres of federal land managed by BLM that are located in the desert region of eastern San Bernardino County, approximately 5 miles southwest of Primm, Nevada. Prepared detailed studies of impacts of the project on views from nearby Wilderness and National Monument lands

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and provided expert witness testimony on the visual resources issues before the California Energy Commission.

Solar Reserve; Rice Solar Energy Project; Riverside County, California. Senior reviewer for the Application for Certification visual resource analysis prepared by CH2M HILL's visual resources staff for a solar thermal project proposed by for development on 3,325 acres of privately owned land on the site of the former Rice Army Airfield in the Mojave Desert region of eastern Riverside County. Provided expert testimony before the California Energy Commission (CEC), leading to a determination by the CEC that the aesthetic impacts of the project would be less than significant.

NextLight; Silver State Photovoltaic Power Project; Clark County, Nevada. As the senior consultant, oversaw the preparation of the federal Environmental Impact Statement visual resource assessment for a proposal to develop a photovoltaic power plant on 7,840 acres of federal land managed by BLM located immediately east of Primm, Nevada.

NRG Solar; Alpine Solar Generating Station; Los Angeles County, California. As the senior consultant, oversaw the preparation of the visual resources technical report for a proposal to develop a photovoltaic power plant on 800 acres of privately owned desert land located in the Antelope Valley in northern Los Angeles County. Issues included potential visibility of the project from nearby residential areas and a state park and a state reserve.

AT&T Solar; Pilot Initiative, Analysis of Potential Visual Effects; San Ramon, California. Analyzed the potential aesthetic effects of a 1.1-MW direct-current solar photovoltaic system proposed for installation on the roof of the AT&T headquarters building. Identified and photo-documented views from sensitive viewing areas and directed production of visual simulations to depict the appearance of the installed PV system. Prepared a report that presented the simulations, evaluated the project's effects on the views, and addressed concerns about the potential for the system to create glare effects.

Iberdrola Renewables; Hyder Valley Solar Thermal Project; Maricopa County, Arizona. Prepared the federal Environmental Impact Statement visual resource assessment for a proposal to develop a solar thermal power plant on 1,980 acres of BLM-managed federal land located east of Hyder, Arizona.

Thermal Generation Facilities

Visual Resource Impact Analyses of Gas-fired Power Plants; Various Locations, California. Evaluated potential visual resources impacts of more than 30 gas-fired power plants proposed for a variety of urban and rural settings in California. Identified visual issues, designed the analysis strategies, contributed to development of architectural and landscape treatments, prepared visual resources analyses for the Applications for Certification for submittal to the California Energy Commission (CEC), reviewed and critiqued relevant sections of the CEC's analyses of the projects, and evaluated the visual issues associated with CEC-proposed alternative sites. As an expert witness on visual resources, prepared written testimony and provided oral testimony in hearings before the CEC.

Dominion Energy; Visual Impact of Cooling Tower Alternatives for the Manchester Street Generating Station; Providence, Rhode Island. Evaluated the visual impacts of alternative cooling tower options being considered for a large combined-cycle, gas-fired power plant located at a visually prominent site on the Providence waterfront. Scoped the issues, directed the preparation of analytic maps, identified and photo-documented critical viewpoints, and directed the production of visual simulations depicting the three alternative cooling tower structures and the steam plumes associated with them. Scope also included evaluating the visual impacts of the alternatives on the critical viewpoints, and preparing a report documenting the analysis for submission to the Rhode Island Department of Environmental Management.

Dominion Energy; Visual Impact of Cooling Tower Alternatives for the Salem Harbor Generating Station; Salem, Massachusetts. Evaluated the visual impacts of three alternative cooling tower options being

considered for development at a large harborside coal-fired power plant located near historic and cultural resources of national importance. Scoped the issues, directed the preparation of analytic maps, identified and photo-documented critical viewpoints, directed the production of visual simulations depicting the three alternative cooling tower structures and the steam plumes associated with them, evaluated the visual impacts of the alternatives on the critical viewpoints, and prepared the report documenting the analysis for submission to the U.S Environmental Protection Agency.

Hydroelectric Projects

Oroville Facilities Hydroelectric Project; Oroville, California. As part of an Applicant Prepared Relicensing (APR) process, responsible for preparation of initial project documents. Developed outlines and work plans, coordinated with the Department of Water Resources and environmental specialists for each of the issue areas, assembled drafts, edited text, designed final reports, and supervised report production. Responsible for analysis of the visual resource issues associated with the project's reservoir, forebay, afterbay, canals, dam structures, power houses, and fish ladder facility. Technical advisor to the Land Use, Land Management, and Aesthetics Work Groups, requiring participation in sessions involving agency staff, representatives of Indian Tribes and Non-Governmental Organizations, and members of the general public.

Willamette Falls Hydroelectric Project; Oregon City and West Linn, Oregon. As part of the APR process, prepared analyses of visual resources issues that include evaluations of the appearance of the falls under varying flow conditions, as well as assessments of the relationship of project structures to the project's landscape setting.

Aesthetic and Site Enhancement Studies, Shoshone Falls Hydroelectric Project, Idaho. Consultant to Idaho Power on the effects of proposed relicensing of the Shoshone Falls hydroelectric project on the aesthetic qualities of the falls and adjacent park. Provided direction for development of the analysis approach for assessing the effects of changes in flows over the falls on the falls' appearance and public expectations. Evaluated the project in light of local government and land management agency plans and policies, designed and implemented special perception studies, and worked with an advisory committee of representatives of local governments and state agencies. Based on this process, recommended mitigation and enhancement measures. Assisted in preparing a visual analysis report for incorporation into the Exhibit E submitted to the Federal Energy Regulatory Commission.

Federal Energy Regulatory Commission Exhibit E, Snoqualmie Falls Hydroelectric Project; Washington. Analysis of the aesthetic implications of a proposal by Puget Sound Power and Light to increase the capacity of its generating plant at Snoqualmie Falls. Assessed impacts of structural changes and changes to flows over the falls. Developed and applied a methodology for evaluating the effects flow changes would have on the falls' appearance. Prepared the aesthetics section of Exhibit E of the relicense application. Developed the script for a video regarding the aesthetics issues submitted to the Federal Energy Regulatory Commission.

Water Resources Projects

U.S. Army Corps of Engineers Washington Aqueduct Division; Washington Aqueduct Residuals Management Environmental Impact Statement; Washington, D.C. Scoped the aesthetic issues related to new facilities and landscape modifications associated with alternative measures for disposal of water treatment residuals, and designed and implemented a strategy for assessing the aesthetic impacts to provide a basis for comparing the alternatives and preparing the NEPA Environmental Impact Statement.

Los Angeles Department of Water and Power; LADWP Headworks Environmental Impact Report, Los Angeles County, California. Evaluated the potential aesthetic effects of a proposal to construct a large enclosed reservoir at a location near Griffith Park to replace the treated water storage capacity that had been provided by the Silver Lake Reservoir.

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Visual Assessment/Mitigation Recommendations for the San Joaquin Reservoir; Newport Beach, California. Evaluated visual impacts of proposed alternative reservoir cover and water treatment plant options for a Metropolitan Water District water supply facility located in an affluent residential area. Developed a proposal for design mitigation measures that led to project acceptance by residents of the neighborhood overlooking the reservoir.

Red Bluff Diversion Dam; Tehama County, California. Developed the analysis plan for and directed the assessment of the aesthetic changes associated with a set of alternatives being considered for changes in management of the Red Bluff Diversion Dam to enhance passage for anadromous fish. Changes being considered included construction of a massive pumping facility, new fish ladders, and a dam bypass and elimination of an aesthetically and recreationally important lake created by the dam either entirely, or for all but two or four months of the year. The analysis, which included preparation of simulations, was summarized in an aesthetics chapter prepared to meet the requirements of both the NEPA and CEQA.

Landfill Projects

Kettleman Hills Landfill Project; Kings County, California. Conducted analyses of the potential aesthetic effects of a major expansion of Waste Management's Kettleman Hills Landfill. The analysis included identification of sensitive viewpoints in the surrounding area and preparation of visual simulations of the effects of the proposed expanded landfill areas on these views. Presented the results of the analysis in the form of the visual resources chapter of the project Environmental Impact Report.

Chiquita Canyon Landfill Expansion; Los Angeles County, California. Provided scoping, analysis design, and senior review for an assessment of the potential aesthetic effects of a proposed expansion of the Chiquita Canyon Landfill. The analysis strategy included documentation of the visual effects of existing landfills in Southern California that are comparable to what is being considered at Chiquita Canyon. In addition, studies were conducted of the potential visibility of alternative fill levels and patterns at Chiquita Canyon, and assessments were made of the changes the alternatives would have on views from sensitive locations.

Transportation Projects

Port of Los Angeles Berths 97-109 Container Terminal Project; San Pedro, California. Developed the analysis plan for and implemented the assessment of the aesthetic impacts of a major new terminal proposed for the West Basin area of the Port of Los Angeles. Special attention was given to the visual effects of the ten 248-foot-high shore-side gantry cranes proposed for installation near the Vincent Thomas suspension bridge, an important regional landmark. Identified mitigation measures that were adopted to reduce and compensate for the project's aesthetic effects.

SR-79 Environmental Document Visual Impact Technical Study; Riverside County, California. Directed the analysis of the potential aesthetic impacts of alternative alignments of a 20-mile-long freeway being planned for the rapidly developing San Jacinto Valley. Landscape conditions range from rural to suburban. Applied FHWA procedures to develop an analysis consistent with Caltrans specifications. Identified the aesthetic impacts associated with each of the alternative alignments and recommended mitigation measures.

SR-47 Environmental Document Visual Impact Technical Study; Los Angeles County, California. Directed the analysis of the potential aesthetic impacts of alternatives for the replacement of the Schuyler Heim Bridge and for construction of an elevated freeway to connect SR 47 with the Alameda Avenue expressway. The project is located in a visually complex region that includes the Ports of Los Angeles and Long Beach and nearby industrial, recreational, and residential areas. Applied FHWA procedures to develop an analysis consistent with Caltrans specifications.

California High Speed Rail Authority; California High Speed Rail Environmental Impact Report; Southern California. Evaluated the potential aesthetic impacts of a proposed high speed rail route extending from downtown Los Angeles to downtown San Diego by way of San Bernardino and Riverside. The route included

depressed, at-grade, and overhead segments that would pass through a variety of urban, suburban, and rural settings, many of which have highly valued visual qualities. In addition to identifying and documenting potential impacts, recommended measures for impact mitigation.

Bay Area Rapid Transit (BART) Warm Springs Extension; Fremont, California. Analyzed the aesthetic impacts of a proposed 7.8-mile extension of the BART heavy-rail system from the city of Fremont to Santa Clara County. Prepared the aesthetics section of the CEQA-mandated Environmental Impact Report.

Urban Freeway Design Research; France and US. Conducted research comparing American and French approaches to planning and design of urban freeways to optimize their integration into the urban environment. Research included literature review, interviews with highway engineers and landscape architects in the U.S. and France, review of plans and environmental assessments, and site visits to exemplary projects.

Chevilly-Larue Roadway Design Evaluation Study, France. Member of a study team that evaluated the effects of urban design measures intended to improve traffic safety and aesthetics that were installed on a heavily traveled road through the center of a suburban community. Developed a research strategy and questionnaire for documenting resident perceptions before and after the installation of the measures.

Land Use, Natural Resource, Facility Siting, and Urban Design Studies

East Anderson Receiving Station Growth Impact Study; Phoenix, Arizona. For the Salt River Project, analyzed the land use development implications of a large electric receiving station proposed for a developing area on the edge of Phoenix. Directed collection, mapping, and analysis of demographic, economic, land use, infrastructure, planning, and policy data, and generation of projections of future land use patterns under project and no-project scenarios.

Growth and Development Studies; Northern and Central California. At PG&E, designed, scheduled, and managed studies evaluating growth trends and forecasting future population and land use in urban and rural areas throughout Northern and Central California to provide a basis for planning and siting future electric facilities. Supervised work that included coordination with local planning agencies; data gathering and evaluation; analysis of economic, demographic, environmental, infrastructure, and policy data; development of growth projections; and reporting of findings.

University Teaching

Lecturer; Department of City and Regional Planning, University of California, Berkeley. Taught CP 214, "Urban and Regional Physical Infrastructure," a graduate-level course providing a survey of the major infrastructure systems, their characteristics and impacts, and their relationships to the planning of cities and regions.

Assistant Professor; Department of Urban and Regional Planning, California State Polytechnic University, Pomona. Designed and taught undergraduate courses in urban design, and natural factors in planning. Taught studio sections of courses in graphic communication and design and in subdivision design.

Visiting Lecturer; Ecole Nationale des Ponts et Chaussées. Paris, France. Taught "The Urban Environment," a lecture course in English for engineers and planners on environmental quality issues and their treatment in project planning and design.

Instructor. Departments of Landscape Architecture and City Planning, University of California, Berkeley. Co-taught "The Urban Environment" a graduate-level course reviewing methods for treating environmental quality issues in the planning and design process. Assisted in teaching "Social Factors in Landscape Design."

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Selected Professional Reports, Publications and Conference Papers

Property Values

Book Review of *Towers, Turbines, and Transmission Lines: Impacts on Property Value* by Sandy Bond, Sally Sims, and Peter Dent. Accepted for Publication by *Noise Control Engineering Journal*. 2014.

Electric Transmission Lines and Property Values—Proposal for a Program of Research. Presentation at the Edison Electric Institute/National Rural Electric Cooperative Association Siting Workshop, Burlington, Vermont. October 20, 2009.

Addressing Transmission Line and Wind Power Property Value Issues; Properly Informing the Public, Regulators, and Policy Makers. Invited Presentation to the 2008 Edison Electric Institute and National Rural Electric Cooperative Association Electric Facility Siting Workshop, Minneapolis, MN, October 7, 2008.

Transmission Lines and Property Values: Review of the Research and Summary of Key Findings: Report to the Emerging Technology Issues Advisory Committee of the Virginia General Assembly Joint Commission on Technology and Science. July, 2005.

The Effects of Overhead Transmission Lines on Property Values: A Review and Analysis of the Literature (with Cynthia Kroll, Ph.D.). Prepared for the Siting and Environmental Planning Task Force of the Edison Electric Institute. 1992.

A Statistical Analysis of Transmission Line Impacts on Residential Property Values in Six Neighborhoods (with Patrice Ignelzi). Prepared for the Southern California Edison Company. May 1991.

A Guide to Assessing Transmission Line Impacts in Residential Communities (with Patrice Ignelzi). Washington, DC, Edison Electric Institute. 1990.

Transmission Line Impacts: Studying Perceptions and Property Values. (videotape, contributing author of script). Washington, DC, Edison Electric Institute. 1990.

Public Perceptions of Electric Facilities

Public Perception of Electric Facilities, an Advanced Workshop. Washington, DC. *March 17, 18, 19, 1996: Workshop Summary* (editor). Published by the Edison Electric Institute, Washington, DC, 1997.

Perception of Transmission Lines: Summary of Surveys and Framework for Further Research (with Kenneth Craik, Mary Deming, and Selma Monsky). International Electric Transmission Perception Project. Published by Edison Electric Institute, Washington, DC, 1996.

"Environmental Perception, Cognition, and Behavior: Public Responses to Electric Transmission Lines" (with Gary Evans, Ph.D.). *Journal of Environmental Psychology* 16, 65–74. March 1996.

Perceived Effects of Electric Transmission Facilities: A Review of Survey-Based Studies. Prepared for the Siting and Environmental Planning Task Force of the Edison Electric Institute. 1992.

Perceptions of a Transmission Line in a Residential Neighborhood: Results of a Case Study in Vallejo, California (with Gary Evans, Ph.D.). Prepared for the Southern California Edison Company. November 1990.

"Perceptions of Transmission Lines in Residential Neighborhoods: Results of a California Case Study." *Edison Electric Institute Workshop on Transmission Lines in Residential Neighborhoods: Issues in Siting and Environmental Planning*. Portland, Oregon, October 1989.

"Study of the Effects of an Electric Transmission Line on Perceived Neighborhood Quality." IAPS 10, Delft, Holland. July 1988.

Electric Facility Planning, Design, and Evaluation Issues

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Wind Power: Aesthetics and Community Acceptance. Presentation at the American Wind Power Association Wind Power Siting Workshop. Portland, Oregon. February 19, 2013.

Visual Impacts: Providing Decision Makers With the Information They Need. Presentation at the American Wind Energy Association WINDPOWER conference. Anaheim, California. May 20–25, 2011.

Visual Impacts of Renewable Energy Facilities: New Issues and New Strategies for Impact Assessment. Presentation at the Edison Electric Institute/National Rural Electric Cooperative Association Siting Workshop. Phoenix, Arizona. October 6, 2010.

Aesthetic Issues in Wind Power Siting and Licensing. Presentation at the American Wind Energy Association Wind Power Siting Workshop. Denver, Colorado. February 18, 2010.

An Introduction to Shadow Flicker and its Analysis. Presentation that was part of the New England Wind Education Project (NEWWWP) Webinar #5 on “Understanding the Current Science, Regulation, and Mitigation of Shadow Flicker.” February 10, 2010.

Addressing Transmission Line and Wind Power Property Value Issues; Properly Informing the Public, Regulators, and Policy Makers. Invited Presentation to the 2008 Edison Electric Institute and National Rural Electric Cooperative Association Electric Facility Siting Workshop. Minneapolis, Minnesota. October 7, 2008.

Wind Power Visual Impact Assessment: Practical Issues and Links to Research. Invited Presentation to the National Wind Coordinating Committee Workshop on Technical Considerations in Siting Wind Developments. Washington, DC. December 1, 2005.

Getting it Right with Local Government: Dealing With Aesthetic Issues Up Front. Presentation at the American Wind Energy Association WINDPOWER conference. Denver, Colorado. May 16–18, 2005.

Wind Power Visual Impact Assessment: Practical Issues and Links to Research. Invited Presentation to the National Wind Coordinating Committee Workshop on Technical Considerations in Siting Wind Developments. Washington, DC. December 1, 2005.

Technical Issues in Developing Wind Projects: Aesthetics. Presentation at the American Wind Energy Association Wind Power Siting Workshop. Portland, Oregon. October 13, 2004.

Addressing the Aesthetic Challenges Faced by the Wind Industry: Research to-Date and Insights from the Environmental Design Paradigm. Presentation at the Global WINDPOWER conference. Chicago, Illinois. March 31, 2004.

L' integration dans l'environnement des ouvrages de transport d'énergie électrique (in collaboration with Aménatech). Prepared for Hydro-Québec and Electricite de France. 1996.

Environmental Design Issues Associated with Older Substations (with Aménatech). Report prepared for Hydro-Québec, Vice-présidence Environnement. October 1995.

“The Public and Electric Facility Siting” (with Daniel Cohen). Article published in *Environmental Planning Quarterly*, Spring 1995.

Substations in the Urban Context: Design Issues and Examples. Report prepared for Hydro-Québec, Vice-présidence Environnement. 1994.

Colusa County Transmission Line Element. Paper presented at Edison Electric Institute National Land Management Workshop, Duluth, Minnesota, August 1992, and included in the workshop proceedings.

Undergrounding of Electric Transmission Lines: A Review of Recent Cases in the United States. Prepared for Vice-présidence Environnement, Hydro Québec. July 1990.

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Aesthetic Quality Issues and Their Treatment in Electric Transmission Line Planning - Towards a New Paradigm. Ph.D. Dissertation, Department of Landscape Architecture, University of California, Berkeley. September 1988.

Aesthetic Considerations and Electric Utilities: An Introductory Guide to the Literature. Palo Alto, CA: Electric Power Research Institute. February, 1984.

Transmission Lines and Land Use Development: Final Report. Prepared for the Community and Regional Planning Task Force of the Edison Electric Institute. 1983.

Other Planning and Design Issues

"Donald Appleyard's Contribution to Street Livability Research." *Proceedings, Fifth Annual Pedestrian Conference*. Boulder, Colorado: Transportation Division, City of Boulder, 1984, pp. 19-27.

Chinatown Urban Design Study (with Peter Bosselmann, et al.). Berkeley Environmental Simulation Laboratory. 1984.

Sun, Wind, and Comfort: A Study of Open Spaces and Sidewalks in Four Downtown Areas (with Peter Bosselmann, Edward Arens, et. al.). Berkeley, California: Institute of Urban and Regional Development. 1984.

"The Field of Visual Analysis and Resource Management: A Bibliographic Analysis and Perspective" *Landscape Journal*. Spring 1983. pp. 52-59.