

**FEAR (AS A MEASURE OF DAMAGES) STRIKES OUT: TWO CASE STUDIES
COMPARISONS OF ACTUAL MARKET BEHAVIOR WITH
OPINION SURVEY RESEARCH**

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FEAR (AS A MEASURE OF DAMAGES) STRIKES OUT: TWO CASE STUDIES COMPARISONS OF ACTUAL MARKET BEHAVIOR WITH OPINION SURVEY RESEARCH¹

By

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INTRODUCTION: BACKGROUND TO THE RESEARCH PROBLEM

For more than a decade, since the early 1980s, a feeling has developed among homeowners and landowners in proximity to what have come to be known as Locally Undesirable Land Uses (LULUs) represent hazards to human health and safety. As a result, increasing numbers and amounts of claims for damages associated with property value diminution have been filed in both State and Federal Courts. The major reason given is the existence of "widespread public fear" and "widespread public perceptions of hazards" emanating from these LULUs.

The list of claimed or perceived hazards is long and growing. The hazards include: water contamination from toxic and hazardous materials, soil contamination from toxic and hazardous materials, air contamination from toxic, hazardous and noxious materials, noise from airports or highways (or both), radiation from various sources, Electro Magnetic Fields (EMFs) from distribution and transmission power lines, fire and/or explosion from natural gas pipelines, and of course hazardous and toxic materials from landfills or waste storage facilities. All of this is in addition to visual and aural impacts that intrude on "quiet enjoyment."

From these claims, and several important Court decisions based upon them, a mythology about the direct, linear relationship between "widespread perceived fear" and diminished values

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of residential properties proximate to these sources of perceived hazards has emerged. The objective of the research reported in this paper is to examine and test the premises on which that mythology has been constructed.

Early Proximity Impact Study Results: Market Fact v. Expert Opinion

In 1983-84, RECGC conducted a study in Orange County, New York, to identify and measure any effects on market prices associated with proximity to High-Voltage Transmission Lines (HVTLs).⁵ In the course of conducting interviews with local real estate brokers, real estate appraisers and mortgage lenders active in the local residential market, we discovered the intriguing fact that the price or value impact opinions of locally active residential real estate professionals were substantially more negative than those of residents living on properties that abutted the HVTL. In turn, the attitudes and opinions about value impacts expressed by the abutting property resident were markedly more negative than the facts of the marketplace indicated. This particular study was based on an analysis of over 700 sales of single-family residences in proximity to the HVTL being studied. Both Paired Sales and Multiple Regression Analyses (MRA) in the Hedonic Pricing Model format were applied to this data set.

In 1990, Charles J. Delaney made public the results of a survey of professionally designated residential real estate appraisers, whose opinions about the impact of proximity to HVTLs were sought. These expert professionals generally anticipated substantial measurable negative impacts on residential properties proximate to HVTLs. An interesting footnote to that study is that those respondents who had no experience in appraising HVTL-impacted properties had much stronger negative feelings about the price impacts of such proximity than did designated residential appraisers experienced in valuing such properties.⁶

Emergence and Growth of the Fear Argument

Starting in 1981, the Supreme Courts of several states indirectly encouraged greater reliance on opinion survey research in condemnation cases by holding in varying fashion that "widespread public fear" of hazards to human safety and health may be admissible evidence in damage claims. Moreover, these cases have uniformly held that the reported or perceived "widespread public fear" need not be "reasonable." In this context: "reasonable" means that it is based on known and supportable scientific fact.

Most of the cases dealing with the admissibility of "widespread public fear" as an explanation for any reported or demonstrated diminution in residential property values "close

⁵This study is cited as Reference No. 25 in the Selected References at the end of this paper.

⁶This study was subsequently published in the Summer 1992 issue of the *Journal of Real Estate Research*.

to" sources of hazards to human safety or human health have been based on fear of EMFs. An early case was *Willsey v. Kansas City Power* (631 P.2d 268). The *Willsey* Court held that the reported widespread public fear need not be "reasonable" to be admissible. This was followed in 1987 by the Florida Supreme Court Ruling in the combined cases of *Florida Power & Light v. Jennings* and *Florida Power & Light v. Roberts* (518 So.2d 895). These decisions specifically contradicted the previously widely held judicial view that, in order to be admissible, evidence of widespread public fear had to be "reasonable" and supported by the weight of scientific evidence. Once again, demonstrating that widespread public fear exists provides an explanation (or an indication of a cause) of any reported or demonstrated diminution in market prices or values of nearby residential properties.

This position was reinforced in November 1988 by the California Appellate Court in *San Diego Gas & Electric v. Daley* (205 CAL APP 3d 1334). Shortly thereafter, further support came from *Ryan v. Kansas Power & Light* (815 P.2d 528). Both the *Ryan* and the *Daley* Courts mentioned with approving approbation the earlier *Willsey*, *Jennings* and *Roberts* decisions. Nevertheless, it still remained quite clear that admitting evidence of widespread public fear served to explain or identify the cause of any price or value decreases found from market analysis.

Then, in October 1993, the New York State Court of Appeals cited all of the foregoing cases in *Criscuola v. Power Authority of the State of New York* (592 N.Y.S. 2d 79). The *Criscuola* Court specifically stated: "We, of course, do not hold that claimants are relieved from giving any proof to establish their claims and adjust compensation damages....Claimants should have to connect the market value diminution of the property to the particular fear in much the same manner that any other adverse market effects are shown."

Meanwhile, in a non-EMF case, the New Mexico Supreme Court in *City of Santa Fe v. Komis* (845 P.2d 753) upheld a lower court finding that evidence of widespread fear of living in proximity to a highway on which radioactive waste and radioactive fuel was planned to be transported (when the highway was finished) provided a sufficient basis to demonstrate the claimed loss in Market Value of a remainder parcel of vacant land suitable for residential development. That remainder parcel extended for approximately one mile from the boundary of the taking (the edge of the highway right of way). The jury in this case awarded approximately 10% of the value of the remainder as consequential damages.

Clearly, the Courts have signaled that they will consider and accept evidence of "widespread public fear" of some perceived source(s) of hazards to human health and safety. This position has stimulated the use, application and (in some instances) misuse of opinion survey research as the foundation for identifying and measuring proximity damages to affected residential properties.

Emphasis on Survey Research and Contingent Valuation

One of the serious potential problems associated with widespread, unchecked application of the "fear" decisions discussed above is that they tend to encourage the use of causal or "bad" survey research procedures, and the dissemination of the results of such studies. Recent attempts to utilize the opinions of survey interviewees (selected at random from the telephone directory for a given area) as the direct basis for claims of property value losses demonstrate this risk. Moreover, the literature of opinion research suggests strongly that respondents frequently do not, in fact, behave in the way that they say they would, when they are confronted with an actual purchase or sale decision, rather than a hypothetical choice.

Inconsistency in opinion survey research procedures is also often reflected in substantial spreads between the reported desire for compensation for being near a hazard, and the indicated willingness to avoid that hazard.

These issues have been addressed with considerable thought and in detail in the report of the Advisory Committee to the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce. That report is cited in the Selected References, No. 38.

Two important points must be recognized. First, there is a great difference between the reliability and supportability of responses to hypothetical circumstances in opinion survey research studies (no matter how carefully and objectively constructed and executed) and the reports of actual market behavior of buyers and sellers on the competitive market. The latter are *ex post* and represent market fact; the former are *ex ante* and represent conjecture or expectation based on responses to hypothetical situations. Each has its use in real estate market research. They are best employed in tandem, to check on their probity and credibility.

Research Questions

The research reported in this paper sought to provide at least preliminary answers to the following questions:

1. Can the results of opinion survey research and Contingent Valuation in the private real estate market be used as a substitute or proxy for actual market sales transactions data and analysis?
2. Is there a consistent, measurable difference or bias between the results of the two alternative valuation procedures?
3. What is the operational meaning of an opinion survey research finding that a large percentage of interviewees would not consider purchasing a house within a certain distance of a perceived source of hazard to human health and safety?

- a. Similarly, can the results of opinion survey research be used as a substitute or proxy for market sales transactions data and analysis in identifying and measuring the likely market impact on sales prices of residences proximate to a source of perceived hazard to human health and safety?

CASE STUDIES

In an attempt to answer the questions posed above, we conducted two (2) studies in which claims of substantial negative property value impacts were made as a result of anticipated proximity to a perceived hazard to human health and safety resulting from a taking of land under Eminent Domain. In each case, the plaintiffs employed and relied upon the findings of opinion survey research. In each study, we conducted MRA modeling studies, using the Hedonic Pricing Model format. We then compared the results and findings in each case.

Case No. 1: Highway Proximity Impact (Transportation Corridor for Nuclear Waste and Fuel)

1. Facts of the Case

A by-pass highway was proposed around Santa Fe, New Mexico, in part to divert shipments of nuclear waste and nuclear fuel from and to Los Alamos. When the proposed use of the planned highway, as a transportation corridor for nuclear waste and fuel, was made public, organized opposition became active and vocal. This occurred approximately April 1, 1988.

In 1992, the City of Santa Fe, acting on behalf of the New Mexico Highway and Transportation Department, condemned approximately 60 acres of a nearly 700 acre parcel of land zoned for residential use, but relatively inaccessible at the time. This was the Komis property in the New Mexico Supreme Court case cited above.

2. Opinion Surveys

Expert survey research personnel were retained on behalf of the plaintiffs to ascertain whether "widespread public fear" of living in proximity to a transportation corridor for radioactive waste and fuels existed. In addition, the survey research team also sought to identify (as noted in their statement of "Objectives of the Study") estimates of how much respondents thought that property values would decrease as a result of residences and residential land being "close to" the by-pass.

A total of 502 telephone interviews was completed. The interviewees were selected through computerized random sampling. In addition, the order of the questions was systematically rotated so as to avoid bias, according to the authors.

The results of this survey, which are summarized below, were used in the Court Proceeding to identify and estimate the consequential damages to the remainder parcel.

Subsequent to the trial and appeal, a second survey research study was undertaken, primarily to check the results of the first study. This project was divided into two Phases. In Phase I, 401 randomly selected interviewees (who agreed to be interviewed and who also were either homeowners or indicated they planned to purchase a home in Santa Fe within 12 months) responded over the telephone. At the end of the Phase I interview, participants were invited to continue in a subsequent (lengthy) personal interview process.

Phase II consisted of the detailed personal interviews. One hundred twenty-nine (129) interviews were completed. In Phase II, the perceptions of interviewees about property value impacts were ascertained, using Contingent Valuation and Conjoint Analysis.

The findings from the Phase II survey research analysis are also discussed later in this paper, and serve as a basis for comparison and contrast with the first, all-telephone-interview survey.

3. Market Study

In addition to the post-trial survey research project, a market study was undertaken by the authors. Although New Mexico is a non-disclosure state, 326 single-family residential property sales, 351 residential lot sales, 67 mobilehome pad sales and 65 large parcel (greater than 10 acres) sales were obtained and analyzed. This was a total of 807 sales.

These sales were subjected to Comparisons of Means and Trend Analysis and Multiple Regression Analysis. In addition, Price Indexes were constructed from the MRA models, for standardized one-family residential properties and standardized residential lots.

The time period covered by the analysis was January 1, 1984 through June 30, 1993. The Study Area consisted of the area within 3 miles of the by-pass highway right of way. The "Before-After" date of April 1, 1988 was selected because knowledge of the proposed use of the by-pass and the transportation route for nuclear waste and fuel had become public on that date.

The Study Area was divided into six Distance Zones, as follows:

- Zone A: Up to 1/4 mile from the Right of Way
- Zone B: More than 1/4 mile but less than 1/3 mile from Right of Way
- Zone C: More than 1/2 mile but less than 1 mile from the Right of Way
- Zone D: More than 1 mile but less than 1.5 miles from the Right of Way
- Zone E: More than 1.5 miles but less than 2 miles from the Right of Way
- Zone F: More than 2 miles from the Right of Way

Zone F was used as the Control Area.

Primary emphasis was placed on the price indexes developed, using a standardized house and a standardized lot, with only year of sale and Distance Zone of location as variables. The findings are enumerated and discussed below.

Case No. 2: High-Pressure Natural Gas Transmission Line Proximity Impact

1. Facts of the Case

In December 1990, a major interstate, natural gas transmission company condemned several miles of right of way along the fringes of a major, rapidly growing city in the Western States. The interstate pipeline itself had a diameter of 36 inches, a rated operating pressure of approximately 1,040 pounds per square inch, and was built to all U.S. Federal Energy Regulatory Commission urban/suburban/construction specifications. In the area in question, the pipeline was buried a minimum of 7 feet 8 inches below finished grade; it was as deep as 15 feet at planned major street intersections. The pipeline right of way went through major streets rights of way throughout the taking.

The condemnee owner was a developer of a large, master-planned, mixed-use (predominately residential) community.

The condemnee claimed that fear of accidents, fire and explosions on the part of the general public required a minimum set back or "clear zone" of 240 feet from the center line of the pipeline. Experts for the condemnee also contended that, based on interviews with a random sample of the local populous, sales of houses or of land for residential development would be deterred, and therefore progress more slowly than otherwise would be the case, in an area up to one-quarter mile from the center line of the right of way (approximately 1,300 feet).

2. Opinion Surveys

Attorneys for the condemnee retained opinion research specialists who conducted both "knowledge surveys" and impact opinion surveys, both in the city in question and in three other

areas: two in another Western State, and one in New England. The objective of the "knowledge surveys" was to identify the extent to which residents "close to" high-pressure natural gas transmission lines were aware of the existence of those lines, both at the time of the surveys in 1991 and again in 1993, and at the time of purchase of the property.

In addition, residents of the community in which the contested taking occurred were asked to participate in a lengthy personal interview, in which they were offered alternatives of living at greater and greater distances from a high-pressure natural gas transmission line, at either a stipulated price for a standardized residence, or at reduced prices ("a substantial discount"). In the course of this interview, respondents were provided information about frequency of accidents, numbers of injuries and deaths, and related purported facts associated with natural gas transmission pipelines. The interviewers, in constructing the illustrative examples, made no dissention between natural gas transmission lines and natural gas distribution lines.

The results and findings from these surveys are presented below.

3. Market Studies

The authors were retained by the condemnor gas transmission company to test market behavior both Before and After the taking, since the trial was scheduled for nearly three years after the taking. In this particular instance, it was deemed permissible and appropriate by the Court to have post-taking date information presented. This decision was based on the fact that focus of the claim for damages was the effect of fear of living in proximity to a high-pressure natural gas transmission line, on the market behavior of potential purchasers.

We identified two (2) predominately residential master-planned communities that were under construction and development at the time of the taking. Both were started prior to the taking, one in 1988 and the other in 1990. Since the path of development of the city was from east to west, the two master-planned communities were also built east to west.

Community No. 1 consisted of two (2) square-mile parcels extending from east to west. The pipeline was buried 65 feet from the western boundary of Community No. 1.

We obtained 2,629 sales of single-family residences that occurred between January 1, 1988 and December 1993. All of these sales occurred within one mile of the western boundary of the development, which is 40 feet east of the eastern boundary of the pipeline right of way, and 65 feet east of the pipeline itself.

The residential sales transactions were categorized into six Distance Zones:

Zone A:	0-200 Feet
Zone B:	201-400 Feet
Zone C:	401-800 Feet
Zone D:	801-1300 Feet
Zone E:	1301-2600 Feet
Zone F:	Over 2600 Feet (up to one mile)

Both descriptive statistics and MRA in the Hedonic Pricing Model format were employed. Indications of the impact of proximity to the pipeline (represented by Distance Zone) were developed for Sales Price and Sales Price per Square Foot of Living Area, sales volume and (when available) marketing time ("Days on the Market").

Based on the results of the MRA models, price indexes were developed for standardized houses within Community No. 1. The findings are summarized below.

Community No. 2 consisted of approximately 1,840 acres of master-planned developable area. In December 1990, the closest developed lot was over one-half mile from the pipeline right of way. From January 1991 through December 1993, development and construction moved steadily westward toward the pipeline. By November 1993, orders and deposits were being taken for homes to close in April 1994, on properties in Zones A and B. By December 1993, approximately 20 houses sold in Zone A, and roughly 50 houses in Zone B.

The total data base for Community No. 2 is 2,448 sales. The same Distance Zones were used for the analysis of the sales transactions data for Community No. 2. The same modeling procedures were followed, and a price index for a standardized house was developed. The only difference is that the standardized house had different characteristics from the standardized house in Community No. 1, reflecting the differences between the two (2) master-planned communities.

In particular, Community No. 2 was built around two linear 18-hole golf courses. This meant that approximately one-third of all the properties are on "fairway lots", while another 5-8% are on "greenbelt". In a development, consisting of small lots, fairway and greenbelt proximity carry substantial premiums.

In addition, some of the housing units built in Community No. 2 are in duplex, triplex or quadruples structures. This, too, affects sales price noticeably. These factors had to be taken into consideration in establishing the models, as well as the standardized house in the analysis. The results of these analyses are presented in the Findings below.

FINDINGS

Highway Proximity Impact Claims

The findings of the two (2) Opinion Surveys and the Market Sales Research Study in the highway proximity impact case are summarized in Table 1.

Only Opinion Survey No. 2 included personnel interviews. Both surveys showed a high degree of familiarity with the project, as far as the respondents were concerned. The opinions surveys differ dramatically, however, in terms of the perceived negative on property values associated with living in proximity to a highway that serves as a transportation corridor for nuclear waste and nuclear fuel. Not only was there a much lower percentage of respondents who anticipated a negative impact, in Opinion Survey No. 2, but the percentage that expected a positive impact was much higher.

The estimated negative impact in Opinion Survey No. 1 ranged from slightly less than 10% up to 40%. Within this range of expected impact, 71% of the respondents (as indicated above) forecast a negative impact. No information was provided about the estimated positive impact, in the report of Opinion Survey No. 1.

On the other hand, the forecast of positive impact led to higher price increase expectations on average than the average price decrease expectation reported in Opinion Survey No. 2. In addition, Opinion Survey No. 2 differentiated between properties less than one mile from the highway right of way, and properties within one-quarter mile of the highway right of way. Substantially greater negative impacts were identified here, except that the average price decline, forecast or expected, was virtually the same.

Generally speaking, Opinion Survey No. 2 shows substantially less negative impact, but nevertheless some anticipated negative impact on price as a result of being either less than one mile or less than one-quarter mile from the highway right of way.

The Market Sales Research Study, on the other hand, showed little effect from proximity to the highway right of way, whether the focus of the analysis was single-family residential properties or residential lots.

The coefficient for Zones A, B and C were negative, but none was statistically significant. Even if the figures were taken as indicative of price reductions, the typical percentage decline in Zones A, B and C was less than 4%.

The price index figures are much more telling, however. They show unequivocally two important results:

1. There is no systematic pattern of increasing sales price per square foot as the property is farther from the highway right of way, for either the single-family residential data set or the residential lot data set.
2. Zone F figures were not necessarily the highest, nor were Zone A figures the lowest. Whatever influences on sales price were enforced, distance from the highway right of way was not one of them.

Gas Transmission Pipeline Proximity Impact Claims

The findings from the Opinion Survey and Market Sales Research Study in the gas transmission pipeline case are summarized in Table 2.

The Opinion Survey research showed relatively low familiarity with the presence of pipelines in the subject Study Area, but generally greater familiarity (61 %) than in the alternative study areas. These were areas in which the pipeline(s) had been in place for many years, and there had been no accidents or "incidents" affecting these lines.

When interviewees were asked whether they would purchase within certain distances, 85% reported that they would not purchase at full price within 240 feet. This also means that 15% said that they would buy within 240 feet of the pipeline right of way, at no discount. Another 28% said that they would buy with some discount within 240 feet. That is 43% of the total sample. Increasing percentages are associated with increasing distances, but from 490 feet on outward, more than half the respondents said that they would buy within that distance.

Moreover, the median discount for those saying that they would expect a discount was 10.5% . This is actually lower than the discount reported in the highway proximity impact opinion surveys, among respondents who anticipated a negative result.

The two Market Sales Research Studies in the gas transmission pipeline case showed generally similar results. The coefficients were not all negative for Distance Zones A through E. Indeed, the coefficients for both A and E (and also D in Community No. 2) were positive. Further, no negative coefficient for Distance Zones B, C or D showed a decline (relative to prices in Zone F) of greater than 5%. None of these was significant, however.

Once again, greatest reliance was placed on the results of the price index. In Community No. 1, Zone A ranked third, while it ranked first in the price index for Community No. 2. There is no systematic pattern whatsoever, except that in each instance, sales price per square foot for a standardized house ranked No. 4 in each of the price indexes.

The most noteworthy findings is that there is, once again, no systematic pattern of decrease in sales price per square foot of a standardized house as the property is located closer

to the pipeline and its right of way. Alternatively, there is no systematic pattern of increasing sales price per square foot as the property is more distant from the pipeline right of way.

CONCLUSIONS

From the foregoing analysis and findings, several important conclusions emerge:

1. Ex ante opinions of interviewees not necessarily involved in buying (or considering buying) in areas claimed to be affected by proximity to a source of fear or hazard to human health and safety are not a substitute or proxy for market sales transactions in identifying and measuring the impact on sales prices of residential properties. The opinions are much more negative than the reflections of actual market behavior of individuals buyers ex post.
2. Actual market behavior is an unequivocal fact, especially when it is possible to construct price indexes of standardized houses or lots for comparative purposes.
3. There is no consistent, systematic market pattern of lower sales price per square foot of living area as properties become closer to the source of the fear of hazards to human health and safety.
4. Neither sales volume nor turnover periods are adversely affected.
5. Buyers behave in this fashion when they are informed about the existence of the alleged feared source of hazards to human health and safety.

IMPLICATIONS FOR POLICY AND FUTURE RESEARCH

1. It is manifestly clear that it is not necessary for all or even most of the potential market to want to buy in a particular location, in order for that property to sell. Further research into what proportion of the market may reasonably be expected or required in order for a property to sell appears to be in order.
2. Further studies need to be made on absorption or turnover periods, as well as sales volume changes, when fear of proximity to sources of claimed hazards to human health and safety exist.
3. One important area of study that should produce very useful results would be a series of ex post behavior surveys. The researchers should ask buyers why they bought where they did and when they did, and how they now feel about their decision. In addition, for major residential lot or house developments, it would be very informative to track down "prospects" who did not buy and to find out from them why they did not.

TABLE 2

SUMMARY OF FINDINGS - GAS TRANSMISSION PIPELINE STUDY

<u>Opinion Survey Research</u>				<u>Market Sales Research</u>	
Number				<u>No. 1</u>	<u>No. 2</u>
Interviews:					
			N	2,629	2,448
Tel.	87/191/204				
Personal	118				
Familiarity:					
			MRA	E	A
			Coeff	A	D
			(in order)	C	C
Subject	61%			D	E
Alt. 1	71%			B	B
Alt. 2	6%				
Alt. 3	27%				
Will Buy Within:					
			Price	E	A
			Index	D	F
			(in order)	A	D
				C	C
				B	E
				F	B
	O Disc.	Subs. Disc.	Total		
240 Ft.	15%	28%	43%		
490 Ft.	26%	30%	56%		
740 Ft.	34%	24%	58%		
990 Ft.	40%	22%	62%		
1240 Ft.	45%	22%	67%		
Md. Discount: 10.5%					

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