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Hilary M. Goldberg & Ray Calnan, Ph.D.



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ON *PARR*: THE USE AND PROPRIETY OF APPRAISAL METHODS IN
COMPUTING FRACKING AWARDS

*Hilary M. Goldberg** & *Ray Calnan, Ph.D.***

ABSTRACT

Parr v. Aruba Petroleum, Inc.,¹ made headlines in 2014 for being the first hydraulic fracturing (“fracking”) case to result in a jury verdict. In *Parr*, a Texas jury awarded \$2.925 million to compensate the Parr family for injuries sustained resulting from Aruba Petroleum’s nearby fracking activities. Of the nearly \$3 million *Parr* verdict, later reversed on other grounds, the jury awarded \$275,000 for diminution in property value.² Thanks to the fiercely litigated and highly publicized trial and appeal, scholars, practitioners and academics received a rare glimpse into an area of litigation otherwise insulated from public view by out of court resolutions and confidential settlement agreements.³

In this interdisciplinary paper, we will provide an overview of the valuation process, addressing issues specific to diminution in value in the context of fracking and similar incidences of environmental contamination. We will then explain the various appraisal methods within the context of real estate litigation, including the Sales Comparison Approach, Income

* Assistant Professor, Department of Business Law & Real Estate, California State University, Northridge; J.D. Loyola University (Chicago), 2003; B.A. University of Notre Dame, 2000.

** Assistant Professor, Department of Business Law & Real Estate, California State University, Northridge; Ph.D. University of Southern California, 2015; M.B.A. California Lutheran University, 2005; B.S. California State University, Northridge, 2003.

¹ *Parr v. Aruba Petroleum, Inc.*, No. 11-01650-E, 2014 WL 10779139 (Dallas Cnty. July 9, 2014) *rev’d on other grounds*, *Aruba Petroleum, Inc. v. Parr*, No. 05-14-01285-CV, 2017 WL 462340 (Tex. App. Feb. 1, 2017). All trial court documents are publicly available at http://www.dallascounty.org/applications/english/record-search/rec-search_intro.php.

² *Id.*

³ A recent compilation catalogs seventy-nine cases. Of those, approximately one-third were dismissed and one-third settled. Blake Watson, *Hydraulic Fracturing Litigation Summary* (Jan. 1, 2017), http://www.udayton.edu/directory/law/documents/watson/blake_watson_hydraulic_fracturing_primer.pdf.

Approach and Cost Approach. Using *Parr* as a test case, we will then analyze the unique appraisal challenges presented by hydraulic fracturing and analogous toxic tort fact patterns, evaluating the probative value and persuasive necessity of each approach. Finally, we will make predictions about the rapidly evolving fracking litigation sphere, analyzing new challenges presented to homeowners, energy companies and the judiciary when faced with allegations of diminished property values.

I. INTRODUCTION

Whether a property owner can recover damages in court for an alleged decrease in property value caused by nearby hydraulic fracturing activities is a highly contested, yet minimally tested proposition. To date, only two fracking cases have reached a jury, and only one of the verdicts specified the amount of damages appropriately allocated for loss of property value.⁴ There is a lack of analysis underlying both the fracking plaintiffs' claims, and the jury results. Moreover, at this early stage in the development of case law, courts are using inconsistent approaches, compounding the uncertainty for litigants on both sides of the bar. Because fracking claims are relatively new and causes of action (and damage prayers) largely untested, parties have failed to perform the kinds of analyses traditionally relied upon in other property damage related cases. Whether fracking harms the environment, and, by extension, property values, is a hotly debated issue. All parties are constrained by the reality of energy dependence, and so the question becomes, is there a measurable loss? If so, how should the loss be calculated and who should bear this loss?

Hydraulic fracturing involves the high-pressure pumping of fracking fluids into rock formations in order to crack the formations and release the hydrocarbons, a form of natural gas, trapped within the rock.⁵ The contents of the fracking fluid, and whether gas companies must disclose chemicals

⁴ *Parr v. Aruba Petroleum, Inc.*, No. 11-01650-E, 2014 WL 1921956 (Dallas Cnty. Apr. 22, 2014), *rev'd on other grounds*, *Aruba Petroleum, Inc. v. Parr*, No. 05-14-01285-CV, 2017 WL 462340, at *2 (Tex. App. Feb. 1, 2017); *Ely v. Cabot Oil & Gas Corp.*, No. 3:09-CV-2284, 2016 WL 5104836 (M.D. Pa. Mar. 10, 2016).

⁵ JoAnne L. Dunec, *On Shaky Ground: Fracking, Acidizing, and Increased Earthquake Risk in California*, 28 NAT. RESOURCES & ENV'T, Spring 2014, at 61.

contained therein, is a hotly debated topic.⁶ While environmental groups lobby for full disclosure, energy companies cite trade secret protection to limit public disclosure.⁷ The fluid injected in the fracking process contains mostly water and a propping agent, such as sand, to keep the cracks open; however, it also contains “a small percentage of chemical additives.”⁸ Regardless of its contents, all acknowledge the existence of chemicals in fracking fluid, and most agree that a portion of the fracking fluid will ultimately return to the surface as flow-back, increasing environmental concerns⁹ and, as nearby property owners posit, decreasing nearby property values.¹⁰

Municipalities have encountered significant obstacles to the regulation of fracking within their borders, largely due to state action, such as Pennsylvania’s Act 13 of 2012,¹¹ which “permits industrial oil and gas operations as a use ‘of right’ in every zoning district throughout” the state, eliminating many of the administrative checks and balances of local zoning laws.¹² According to the EPA, “[b]etween 2000 and 2013, approximately 9.4 million people lived within one mile of a hydraulic fractured well.”¹³ Courts have acknowledged, “environmental harms are often irreparable, and the particular environmental injury . . . associated with fracking—is irreversible once a well is fracked.”¹⁴ With so many people living in such close proximity to fracking facilities, one might speculate that fracking litigation will dry up only after the wells do.

⁶ Susan L. Brantley & Anna Meyendorff, *The Facts on Fracking*, N.Y. TIMES (Mar. 13, 2013), <http://www.nytimes.com/2013/03/14/opinion/global/the-facts-on-fracking.html?pagewanted=all>.

⁷ Paul J. Betzer & Jason B. Brinkley, *Mixology 101: Blending Trade Secret Protections and Fracking Chemical Reporting*, 29 NAT. RESOURCES & ENV’T, Spring 2015, at 29.

⁸ Brandon J. Murrill & Adam Vann, CONG. RESEARCH SERV., *Hydraulic Fracturing: Chemical Disclosure Requirements* 1 (2012), <http://www.fas.org/srgp/crs/misc/R42461.pdf>.

⁹ Jeffrey M. Gaba, *Flowback: Federal Regulation of Wastewater from Hydraulic Fracturing*, 39 COLUM. J. ENVTL. L. 251, 317 (2014).

¹⁰ Nancy D. Perkins, *The Fracturing of Place: The Regulation of Marcellus Shale Development and the Subordination of Local Experience*, 23 FORDHAM ENVTL. L. REV. 44, 49 (2012).

¹¹ 58 PA. CONS. STAT. §§ 2301–3504 (2016).

¹² Christian C. Hagen-Frederiksen, Note, *Beyond Fracking: How Robinson Township Alters Pennsylvania Municipal Zoning Rights*, 34 J.L. & COM. 375, 382–83 (2016) (citing *Robinson Twp. v. Commonwealth*, 83 A.3d 901, 979–80 (Pa. 2013)).

¹³ U.S. ENVTL. PROT. AGENCY, ASSESSMENT OF THE POTENTIAL IMPACTS OF HYDRAULIC FRACTURING FOR OIL AND GAS ON DRINKING WATER RESOURCES 7–8 (2015).

¹⁴ *Diné Citizens Against Ruining Our Env’t v. Jewell*, 2015 WL 4997207, at *1 (D.N.M. Aug. 14, 2015).

II. THE ROLE OF EXPERT APPRAISAL OPINIONS IN FRACKING CASES

After noticing a pronounced increase in fracking-related lawsuits in 2009, practitioners and scholars began to question what type of evidence courts would require of plaintiffs alleging fracking-related claims.¹⁵ Initially, practitioners drew parallels to the previous progeny of groundwater contamination cases, drawing the United States Supreme Court's *Daubert* decision into the fray of fracking litigation.¹⁶ Plaintiffs' attorneys initially focused on hydrological contamination experts to prove the existence of contamination in the groundwater, and medical causation experts to draw the required causal link between the contamination and the injury.¹⁷ Establishing causation through expert testimony is both costly and uncertain, as both sides present competing experts to the fact finder.¹⁸ This obstacle led to the proliferation of nuisance-based lawsuits, wherein plaintiffs pursued claims for injury to health and home without relying on expert opinion.¹⁹ Recent decisions appear to be reining in the proliferation of nuisance-based claims, re-anchoring stakeholders to classic negligence and strict liability claims.²⁰ As one Texas Appeals court recently observed, "[t]he term 'nuisance' has haphazardly been used by courts and legal commentators because through a 'series of historical accidents . . . nuisance [has come] to cover the invasion of different, and unrelated, kinds of interests and to refer to various kinds of conduct on the part of the defendant.'" ²¹ Ultimately, when it comes to the use of expert testimony regarding any alleged diminution in property value in fracking cases, regardless of the cause of actions asserted, "one lesson is clear: the reliability of these expert witnesses will have significant impacts on which parties prevail in the unfolding fracking litigation."²²

¹⁵ See Steven A. Luxton & W. Brad Nes, *Daubert, Groundwater Contamination, and The Future of Fracking Litigation*, 61 THE ADVOC. (Texas), Winter 2012, at 26.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ See *Hydraulic Fracturing Case Chart*, ARNOLD & PORTER LLP, <http://files.arnoldporter.com/hydraulic%20fracturing%20case%20chart.pdf> (last visited Feb. 21, 2017).

²⁰ See *Crosstex N. Texas Pipeline, L.P. v. Gardiner*, 505 S.W.3d 580 (Tex. 2016).

²¹ *Sciscoe v. Enbridge Gathering (N. Tex.), L.P.*, 2015 WL 3463490, at *6 (Tex. Ct. App. June 1, 2015), *reh'g overruled* (July 17, 2015) (citing Prosser, *Nuisance Without Fault*, 20 TEX. L. REV. 399, 411 (1942)).

²² Luxton & Nes, *supra* note 15, at 29.

Fast forward to April of 2014, after hundreds of lawsuits filed by plaintiffs seeking damages to health and home allegedly resulting from nearby fracking operations, and countless confidential settlements,²³ the industry received news of its first fracking jury award. In *Parr v. Aruba Petroleum*, the first fracking case to result in a jury verdict, the jury awarded \$2.925 million to a family for injuries to health and home resulting from the intentional private nuisance created by Aruba Petroleum, Inc.'s nearby fracking activities, of which \$275,000.00 was set aside for reduction in property value.²⁴ The *Parr* award was later reversed on appeal, without discussion or commentary from the appellate court concerning the appropriate measure of damages. It signified a perceived diminution by the jury of between 45 and 55 percent in property value.²⁵ In March of 2016, a second jury in *Ely v. Cabot Oil & Gas Corp.* awarded two Pennsylvania families a total of \$4.3 million for "inconvenience and discomfort" suffered as a result of defendants' negligence in drilling and operating nearby fracking facilities which caused groundwater contamination.²⁶ The "inconvenience" awarded for plaintiffs' property damage allegations represents what many in the field call "loss of use." To wit, the *Ely* jury found, specifically, that "Cabot negligently created a private nuisance which significantly harmed any of the Plaintiffs in their use and enjoyment of the property by contaminating the water well[s]."²⁷

Parr, despite having failed to survive appellate review on liability issues, and *Ely*, also facing challenges from defendants,²⁸ have and will

²³ Jim Efstathiou Jr. & Mark Drajem, *Drillers Silence Fracking Claims with Sealed Settlements*, BLOOMBERG (June 6, 2013, 12:00 AM), <https://www.bloomberg.com/news/articles/2013-06-06/drillers-silence-fracking-claims-with-sealed-settlements>.

²⁴ *Parr v. Aruba Petroleum, Inc.*, 2014 WL 10779139 (Dallas Cnty. July 9, 2014), *rev'd on other grounds*, *Aruba Petroleum, Inc. v. Parr*, 05-14-01285-CV, 2017 WL 462340, at *2 (Tex. App. Feb. 1, 2017) (holding that a claim for intentional nuisance requires application of a subjective standard, requiring plaintiff to prove defendant "must have actually desired or intended to create the interference or must have actually known or believed that the interference would result").

²⁵ *Id.*

²⁶ No. 3:09-cv-02284-MCC, 2016 WL 454817 (M.D. Pa. Feb. 5, 2016). For further discussion of the fracking process, see Jhon Arbelaex, Shaye Wolf & Andrew Grinberg, *On Shaky Ground: Fracking, Acidizing, and Increased Earthquake Risk in California*, SHAKYGROUND.ORG (Mar. 2014), https://www.biologicaldiversity.org/campaigns/california_fracking/pdfs/ShakyGroundReport-March2014.pdf.

²⁷ *Ely*, 2016 WL 454817, at *2.

²⁸ Terrie Morgan-Besecker, *Cabot appeals water contamination verdict*, THE TIMES-TRIBUNE (Apr. 9, 2016), <http://thetimes-tribune.com/news/cabot-appeals-water-contamination-verdict-1.2028516>.

continue play meaningful roles in the evolution of fracking-related litigation. The curtain over a decade of secret negotiated outcomes and confidential settlement agreements²⁹ has been drawn to publicly reveal the potential recovery for plaintiffs determined to have their day in court.³⁰ So what does this mean for parties and litigators as they value their cases for demand and settlement purposes? This paper addresses the various appraisal methods available to assess plaintiffs' claims for diminution in property value. By awarding a lump sum for injury to health and home, the *Ely* jury did not specify how much of the \$4.3 million award was set aside for property damages. However, in *Parr*, the jury was asked specifically “[w]hat sum of money, if paid now in cash, would fairly and reasonably compensate Robert ‘Bob’ Parr for loss of market value damages, if any, proximately caused by the nuisance?”³¹ The jury responded: “Answer: 275,000.00.” How did they reach this figure? And, should this award inform the strategy employed by similarly situated litigants?

A. *Parr’s Appraiser Posited a Property Value of Zero Dollars*

In *Parr*, plaintiffs proffered an appraiser who valued the property at \$500,000–\$600,000 if unimpaired. The appraiser further opined that, as impaired, the property had \$0 value because “no willing purchaser would buy the property with the conditions reported.”³² While the litigation was ongoing, however, Mr. Parr listed his property for sale, asking \$699,000. Mr. Parr was asked in deposition, “[w]hen your own expert values your land and house at zero, how can you list it for \$699,000?” He responded, “[n]ot real sure, but, I mean, I’ve got some value to it, and whether—I don’t know how all that works, but, you know, if it sells, it sells. If it doesn’t, I guess I’m

²⁹ A recent compilation catalogs of 79 cases. Of those, approximately one-third were dismissed and one-third settled. See Watson, *supra* note 3.

³⁰ Douglas et al., *Fracking Litigation Update: Despite Successful Pre-trial Motions, Pennsylvania Jury Awards Multi-Million Dollar Verdict*, ARNOLD & PORTER LLP (Mar. 29, 2016), <http://www.arnoldporter.com/en/perspectives/publications/2016/03/fracking-litigation-update>.

³¹ Brief of Appellant, *Aruba Petroleum, Inc. v. Parr*, 2015 WL 7308038 (Tex. App. Nov. 9, 2015) (No. 05-14-01285-CV).

³² Brief of Appellee, *Aruba Petroleum, Inc. v. Parr*, 2016 WL 503291 (Tex. App. Feb. 5, 2016) (No. 05-14-01285-CV).

stuck with it, but I'm going to try.”³³ The property sat on the market for two years without a single offer.³⁴ Mr. Parr's neighbors, the Ruggiero family, who also brought a lawsuit against Aruba, entered into a confidential settlement to resolve their claims which involved the sale of their property to Aruba.³⁵

Notably absent from the record on appeal is an official appraisal report, information regarding comparable sales, or other standard qualifiers usually presented by appraisers as expert witnesses.³⁶ This begs the question, why is it that a full appraisal was not performed? Is there an inherent difficulty in evaluating diminution in value or loss of use damages for properties located in an area surrounded by hydraulic fracturing activities?

III. DOES FRACKING CAUSE FINANCIALLY QUANTIFIABLE PROPERTY DAMAGE?

The risks and benefits of fracking carry broad implications, which have been highly publicized by stakeholders on both sides. Whether fracking *causes* financially quantifiable property damages is a hotly debated issue.³⁷

A. Energy Companies and Proponents Claim Hydraulic Fracturing Adds Value

The natural gas industry posits that property values rise as valuable natural gas resources are discovered nearby. Commentators have argued that, “[w]ithout fracking,” high producing areas such as the Barnett Shale in North Texas “would have remained undeveloped.”³⁸ Similarly, areas surrounding the Marcellus Shale, in “upstate New York south through Pennsylvania to

³³ Clerk's Transcript of Record at 272, *Aruba Petroleum, Inc. v. Parr* (Tex. App. Nov. 9, 2015) (No. 05-14-01285-CV).

³⁴ Brief of Appellee, *Aruba Petroleum, Inc. v. Parr*, 2016 WL 503291, at *39.

³⁵ Reporter's Record on Appeal VOL0002.PDF at 66, *Aruba Petroleum, Inc. v. Parr*, No. 05-14-01285-CV (Tex. App. Nov. 9, 2015).

³⁶ Brief of Appellant, *Aruba Petroleum, Inc. v. Parr*, 2015 WL 7308038, at *53.

³⁷ *Cerny v. Marathon Oil Corp.*, 480 S.W.3d 612, 620 (Tex. App. 2015), *see also* Wenonah Hauter, *Democratic Debate Brings Anti-Fracking Movement to Center Stage*, ECOWATCH (Mar. 8, 2016), <http://ecowatch.com/2016/03/08/democratic-debate-fracking/>.

³⁸ Walker Friedman & Jack Price, *Too Close for Comfort? The Fight Between Local and State Governments over Fracking Bans and Oil and Gas Development*, 79 TEX. B.J. 214, 214 (2016).

West Virginia and west to parts of Ohio” have undergone extensive development. The Marcellus Shale is “thought to contain up to 10 percent of available natural gas deposits in North America,”³⁹ enough to power every home in the country for fifty years at current usage rates.⁴⁰ Acknowledging the existence of what industry experts term a “shale revolution,” the widespread adoption of fracking nationwide has propelled the United States towards “self-sufficiency and with much reduced energy prices.”⁴¹

Energy companies cite the income and jobs infused into local economies, movement towards energy independence and “greener” energy production as gains.⁴² On an individual level, the ability to extract natural gas by property owners previously unaware of their mineral resources yields a financial windfall in the form of valuable mineral leases and property value appreciation.⁴³ But who realizes these gains? What forms do they take? And why isn’t everyone signing up for them?⁴⁴ Appraisers, experts in this field,

³⁹ Hagen-Frederiksen, *supra* note 12, at 376 (citing John C. Dernbach et al., *Robinson Township v. Commonwealth of Pennsylvania: Examination and Implications*, 67 RUTGERS L. REV. 1169, 1171 (2015); *The Marcellus Shale, Explained*, NAT’L PUB. RADIO, <http://stateimpact.npr.org/pennsylvania/tag/marcellus-shale/>).

⁴⁰ Brantley & Meyendorff, *supra* note 6.

⁴¹ Christopher J. Hilson, *Litigation Against Fracking Bans and Moratoriums in the United States: Exit, Voice and Loyalty*, 40 WM. & MARY ENVTL. L. & POL’Y REV. 745 (2016).

⁴² Energy economist Phil Verleger estimates that within a decade, the U.S. “will no longer need to import crude oil and will be a natural gas exporter.” Indeed, he notes, “[e]nergy self-sufficiency is now in sight.” John Ydstie, *Is U.S. Energy Independence Finally Within Reach?*, NAT’L PUB. RADIO (Mar. 7, 2012), <http://www.npr.org/2012/03/07/148036966/is-u-s-energy-independence-finally-within-reach>.

⁴³ Aleem Maqbool, *The Texas Town That Banned Fracking (and Lost)*, BBC NEWS (June 16, 2015), <http://www.bbc.com/news/world-us-canada-33140732> (“What was at stake here were the rights of those families, mineral owners, that were being denied access to their property which is protected under the US constitution,” says Todd Staples, President of the Texas Oil and Gas Association.).

⁴⁴ In March of 2013, Rex Tillerson, United States Secretary of State and former CEO of ExxonMobile Corporation, became a plaintiff in a lawsuit challenging the proposed establishment of a fracking water tower near his home. “The lawsuit, which asserted causes of action for declaratory judgment, injunctive relief, nuisance, inverse condemnation, and fraud, alleged that the water tower would lead to fracking-related traffic and decreased property values. Tillerson received national attention for his participation in this suit, largely mocking him for the perceived contradictory stance.” Hilary M. Goldberg et al., *It’s A Nuisance: The Future of Fracking Litigation in the Wake of Parr v. Aruba Petroleum, Inc.*, 33 VA. ENVTL. L.J. 1 (2015) (citing Second Amended Petition at 2, *Armey v. Bartonville Water Supply Corp.*, No. 2012-30982-211 (Dist. Ct. Denton Cnty. Mar. 15, 2013), <http://online.wsj.com/public/resources/documents/water20140220.pdf>; Daniel Gilbert, *Exxon CEO Joins Suit Citing Fracking Concerns*, WALL ST. J. (Feb. 20, 2014), <https://www.wsj.com/articles/SB10001424052702304899704579391181466603804>; Maurice Richter, *Exxon Mobil CEO Welcomes Fracking, But Not Water Tower In His Backyard*, REUTERS (Feb. 26, 2014), <http://www.reuters.com/article/2014/02/26/us-usa-fracking-tillerson-idUSBREA1P24O20140226>; Rick Ungar, *Exxon CEO Profits Huge As America’s Largest*

have a term for these external market-associated gains or losses: externalities.⁴⁵

B. Plaintiffs and Environmentalists Argue Hydraulic Fracturing Diminishes Value

Scores of confidential settlement payments have been made to plaintiffs alleging injury to person and property, and recent jury awards have publicly recognized the harm allegedly caused by nearby fracking. In *Parr*, the jury specifically set aside \$275,000 for diminution in property value underscoring the notion that nearby fracking is perceived as more of a nuisance than a benefit.⁴⁶

Recently, scholars have drawn attention to fracking's potential for "destabilizing the financial markets" given the "potential environmental impact of fracking on land subject to federal mortgages. When landowners lease land to fracking operators, the banks holding mortgages to such land bear the financial risk associated with a potential decline in property value due to environmental degradation."⁴⁷ The hundreds of cases filed by homeowners, communities, and environmental groups have echoed similar refrains, complaining of injuries to person and property resulting from nearby fracking-related activities.⁴⁸ Relevant here are claims that properties are devalued by the contamination, noise, traffic, and other increases in use and intensity of neighboring properties accompanying fracking activities.⁴⁹ With

Natural Gas Producer—But Frack In His Own Backyard And He Sues!, FORBES (Feb. 22, 2014), <http://www.forbes.com/sites/rickungar/2014/02/22/exxon-ceo-profits-huge-as-americas-largest-natural-gas-producer-but-frack-it-in-his-own-backyard-and-he-sues/#42472f1f3337>.

⁴⁵ Melissa Boyle & Katherine Kiel, *A Survey of House Price Hedonic Studies of the Impact of Environmental Externalities*, 9.2 J. REAL ESTATE LIT. 117–144 (2001).

⁴⁶ In a five to one vote, the *Parr* jury awarded a verdict solely on the theory of intentional private nuisance with a total of \$2.925 million damages: \$2.25 million for pain and suffering, \$400,000 for mental anguish and \$275,000 for loss of value to the family's property. Final Judgment, *Parr v. Aruba Petroleum, Inc.*, 2014 WL 10779139 (Dallas Cnty. July 9, 2014) (No. CC-11-01650-E).

⁴⁷ Shalanda Helen Baker, *Is Fracking the Next Financial Crisis? A Development Lens for Understanding Systemic Risk and Governance*, 87 TEMP. L. REV. 229, 237 n.39 (2015) (citing Ian Urbina, *U.S. May Restrict Mortgages on Properties Leased for Oil and Gas Drilling*, N.Y. TIMES, Mar. 19, 2012, at A12).

⁴⁸ For a discussion of "circular causation" and the dynamic financial impact fracking may have on a local economy, see Benjamin E. Apple, Note, *Mapping Fracking: An Analysis of Law, Power, and Regional Distribution in the United States*, 38 HARV. ENVTL. L. REV. 217, 225 (2014).

⁴⁹ See ARNOLD & PORTER LLP, *supra* note 19.

the increase in seismic activity in highly fracked areas, plaintiffs are now adding earthquake damage to the list of fracking concerns.⁵⁰

C. Strategic Considerations for Property Owners Pursuing Claims Against Energy Company Defendants

While most fracking cases have been settled confidentially, dismissed or otherwise disposed, the decisions on record tend to set the course for an uphill battle for plaintiffs seeking to recover for diminution in property value damages.⁵¹ In such cases, “[d]amages measured by the present diminution in value of property is an adequate and appropriate remedy for harm to either real or personal property.”⁵² The burden is upon the Plaintiff to prove the nature and extent of damages.⁵³ The proliferating litigation in this area, coupled with divergent perspectives presented by environmental protection efforts⁵⁴ and the energy industry, has fueled this circular debate.⁵⁵ Low-income communities may be at particular risk.⁵⁶ Because they have a lower tax base supporting limited resources, they may be more likely to welcome

⁵⁰ Meredith A. Wegener, *Shake, Rattle, and Palsgraf: Whether an Actionable Negligence Claim Can Be Established in Earthquake Damage Litigation*, 11 TEX. J. OIL GAS & ENERGY L. 115, 117 (2016) (New lawsuits are emerging alleging that “specific oil and gas companies caused specific earthquakes, subsequently causing them harm.” (citing Petition at 24, *Ladra v. New Dominion LLC et al.*, 353 P.3d 529 (Okla. 2015) (No. CJ-2014-115))).

⁵¹ ARNOLD & PORTER LLP, *supra* note 19.

⁵² *Seiscoe v. Enbridge Gathering (North Texas), L.P.*, No. 07-13-00391-CV, 2015 WL 3463490, at *12 (Tex. App. June 1, 2015), *reh’g overruled* (July 17, 2015) (citing *City of Tyler v. Likes*, 962 S.W.2d 489, 497 (Tex. 1997)).

⁵³ Christopher S. Kulander, *Common Law Aspects of Shale Oil and Gas Development*, 49 IDAHO L. REV. 367, 374, 377 (2013) (noting that “courts seem slow to find a nuisance caused by noise, smells or light, perhaps reflecting an attitude that the surface owner ought to know what can happen when the surface is purchased over a severed mineral right. Without proof of causation, a clear breach of lease terms, or a breach of a law or a regulation, surface owners thus far have had a challenging time succeeding with nuisance or negligence claims.”).

⁵⁴ For a discussion of standing issues, see Jan G. Laitos, *Standing and Environmental Harm: The Double Paradox*, 31 VA. ENVTL. L.J. 55 (2013).

⁵⁵ Seeking to resolve the issue, and at the request of the United States Congress, the Environmental Protection Agency (“EPA”) has prepared a “review and synthesis of available scientific literature and data to assess the potential for hydraulic fracturing for oil and gas to impact the quality and quantity of drinking water resources.” The EPA released a draft report for public comment and peer review in 2015. See U.S. ENVTL. PROT. AGENCY, EPA’S STUDY OF HYDRAULIC FRACTURING FOR OIL AND GAS AND ITS POTENTIAL IMPACT ON DRINKING WATER RESOURCES (2016), <https://www.epa.gov/hfstudy>.

⁵⁶ For a discussion of how fracking creates the greatest risk to the parties with the least bargaining power, i.e. low-income communities, see Apple, *supra* note 48, at 233–34.

income-producing fracking into their communities, while negotiating fewer protections to mitigate negative impacts, including long-lasting environmental contamination, higher rents and declining property values.⁵⁷

Because each property is unique, rarely are fracking cases amenable to class treatment.⁵⁸ Furthermore, the factors surrounding each drilling operation and its surrounding impact may vary extensively, thus the effect on property values cannot be established by application of a general, blanket calculation, or even one consistent approach. How, then, can an individual plaintiff effectively and economically proceed in the face of costly litigation?

Despite criticism from some scholars regarding the potentially subjective nature of appraisals, the use of professional appraisals in litigation is well established, and becoming increasingly important to the fact-finder as the values of real property continue to rise and verdicts include property value related awards.⁵⁹ There are various methods of valuation available to plaintiffs attempting to prove diminution in value claims. On a strategic level, the probative value of each method must be weighed against the cost associated with the expert testimony.⁶⁰ For plaintiffs who, along with their counsel, bear the expense of gathering evidence (including expert opinions and testimony), balancing cost against probative value becomes a critical part of the strategic litigation framework.

⁵⁷ Apple, *supra* note 48, at 234.

⁵⁸ See Smita Walavalkar, *Digest of Hydraulic Fracturing Cases*, COLUM. CTR. FOR CLIMATE CHANGE L. (Jan. 2013), <https://webcache.googleusercontent.com/search?q=cache:u7LshD3hZQUJ:https://web.law.columbia.edu/sites/default/files/microsites/climate-change/HydraulicFracturingDigestI.docx+&cd=1&hl=en&ct=clnk&gl=us>.

⁵⁹ John F. Shampton, *Statistical Evidence of Real Estate Valuation: Establishing Value Without Appraisers*, 21 S. ILL. U. L.J. 113, 115 (1996) (arguing that real estate appraisals are only as reliable as the expert who formulated the opinion, and should be replaced by real estate valuation models which are “comparatively, better able to quantify ‘value’ in the adjudicatory setting.”).

⁶⁰ *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 595 (1993).

IV. PROBATIVE VALUE OF EXPERT TESTIMONY IN CASES ALLEGING DIMINUTION IN PROPERTY VALUE AND LOSS OF USE

“In an action for nuisance, the plaintiff may recover for both damage to person and damage to property.”⁶¹ Damage to property includes both physical damage, as well as the right of the property owner to the “peaceful occupancy and enjoyment” of the property.⁶² The accepted approaches to value include the sales comparison approach, income capitalization approach and cost approach. These general categories of valuation methods have multiple sub-approaches and techniques; however, a general understanding of the approaches is adequate for most users of real property appraisals in litigation. Determining the appropriate approach is critical and must start with an understanding of the fundamental question of the appraisal assignment⁶³ since a clear set of guidelines for determining the change in values as a result of fracking has not yet been established.⁶⁴

The explanations and examples that follow are simplified and do not delve into the many nuances of each valuation approach. The literature on the use of appraisals and value determination in litigation is broad and contradictory.⁶⁵

⁶¹ *City of Atlanta v. Murphy*, 391 S.E.2d 474, 476 (Ga. Ct. App. 1990) (citing GA. CODE ANN. § 41-1-4; *Sam Finley, Inc. v. Russell*, 42 S.E.2d 452 (Ga. Ct. App. 1947)).

⁶² *The Honorable Ben Brown*, 27 Okla. Op. Att’y Gen. 46 (1997) (citing *Coal & Mining Company v. Few*, 267 F.2d 785, 790 (10th Cir. 1959)) (By way of example, the Attorney General Opinion illustrates other recognized causes of legitimate nuisance claims under the Oklahoma Constitution: “Oklahoma courts have recognized a right to compensation for the ‘noxious fumes and other traits associated with an open sewage lagoon,’ *Schaeffer*, 743 P.2d at 1039, the pollution of groundwater, *Gulf Oil*, 371 P.2d at 81; noise and dust from blasting, *Garland Coal*, 267 F.2d at 787; and the ‘annoyance and inconvenience’ resulting from the operation of nearby oil and gas wells. *British-American Oil Producing Co. v. McClain*, 126 P.2d 530, 533 (Okla. 1942). Article II, § 23 thus provides for compensation for the whole range of injuries normally actionable under a common law nuisance theory.”).

⁶³ Richard J. Roddewig, *Valuing Contaminated Properties, Volume II*, 83.1 APPRAISAL J. Winter 2015, at 78.

⁶⁴ See Richard J. Roddewig & Rebel A. Cole, *Real Estate Value Impacts From Fracking: Industry Response And Proper Analytical Techniques*, 39 REAL EST. ISSUES no. 3, 2014, at 6.

⁶⁵ See Thomas O. Jackson, *The Effects of Environmental Contamination on Real Estate: A Literature Review*, 9.2 J. REAL EST. LITERATURE 91 (2001).

A. Sales Comparison Approach

The preferred method for determining value for a single-family home is the sales comparison approach, because it is generally the easiest to understand and represents the common, practical thinking of most home buyers.⁶⁶ As such, the appraiser prefers to use this approach to properly reflect the logic used by most market participants purchasing a single-family home. This approach also appears to be the preferred approach to courts.⁶⁷

The premise of this approach are the concepts of substitution and competition.⁶⁸ A buyer will purchase a property at a value that reflects the sale price of similar properties that have sold and the list price of properties that are available for sale. Adjustments to sale prices are necessary due to differences between the sold property and the subject property. For example, if the subject property does not have a swimming pool and a recent similar property does, then a reduction in the sale price of the similar property is necessary in order to reflect the value of the pool.

The example below shows the subject property and three similar recent sales. In order to determine the value of the subject property, differences between the subject and the recent sales must be identified. For simplicity, the comparable sales have similar numbers of bedrooms and bathrooms with the only differences being the existence of a garage or pool.

	Subject property	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5
Beds	3	3	3	3	3	3
Bathrooms	1.75	1.75	1.75	1.75	1.75	1.75
Garage	No	Yes	Yes	Yes	No	Yes
Pool	No	Yes	Yes	No	Yes	Yes
Sale Price	TDB	\$ 550,000	\$ 550,000	\$ 525,000	\$ 530,000	\$ 550,000

In order to determine the value of the subject property, given its differences from the recent sales, the appraiser must determine the value that the market attributes to pools and garages. The first step would be to determine the difference in value between Sale 3 and the other three sales that have a pool. In this example, it is evident that the market attributes a \$25,000 value to the existence of a pool since Sale 3 sold for \$25,000 less than other sales with pools and garages. Similarly, the existence of a garage

⁶⁶ Houston Unlimited, Inc. Metal Processing v. Mel Acres Ranch, 443 S.W.3d 820, 829 (Tex. 2014), *reh'g denied* (Oct. 24, 2014).

⁶⁷ JAMES D. EATON, REAL ESTATE VALUATION IN LITIGATION 197–206 (1995).

⁶⁸ APPRAISAL INST., THE APPRAISAL OF REAL ESTATE 27–34 (14th ed. 2013).

is valued at \$20,000 in this example, because the home (Sale 4) lacking a garage sold for \$20,000 less than otherwise comparable homes. In a real situation, multiple pairs or sets of comparables would be used to determine the market preference and value of a particular characteristic of a home.

Once the value of the different characteristics is determined, the appraiser can compare the subject property to the recent sales. In this example, the subject property does not have a pool or garage, so it can be concluded that its value should be \$45,000 less than the recent sales (\$25,000 for the pool and \$20,000 for the garage). Therefore, the concluded value can be determined as \$505,000 for the subject property.

In the case of diminution of value, the analysis may be the same. Instead of an adjustment for a pool, an adjustment for loss of use of a contaminated water well or other attribute can be substituted.⁶⁹ If home sales with negative impact have already occurred, then the appraiser can use the percentage reduction from an unimpaired home to determine the loss attributable to the negative feature.⁷⁰ As illustrated in the example above, the value of the pool is known because previous sales of homes with and without pools are compared. The difficulty the appraiser faces is in finding the value for the first property that has suffered the loss when no previous sales are available. This difficulty is compounded when the impairment is broad and affects a large geographic area. In these cases, the impairment may impact many or all homes that are similar in specific attributes as well as location. Determining the loss of value becomes more challenging when no sales have occurred and all similar properties become similarly impaired, a situation commonly presented in fracking cases. In *Parr*, for example, if the impairment is ongoing and there is transaction data, the sales comparison approach will capture the potential future cost, at least those perceived by buyers active in the market. However, this perception may not reflect the actual cost. The method that helps to properly capture the future cost and helps to overcome the lack of transaction data problem is the Income Approach.

⁶⁹ The cost of actual remediation or repair may only make up a fraction of the total cost when considering all of the potential costs resulting from a detrimental condition. Randall Bell, *The Impact of Detrimental Conditions on Property Values*, 66 APPRAISAL J. 380–91 (1998).

⁷⁰ *Weaver Constr. Co. v. Rapier*, 448 S.W.2d 702, 703 (Tex. App. 1969).

B. Income Approach

The income capitalization approach has two main techniques, direct capitalization and yield capitalization.⁷¹ Direct capitalization uses one year's income to derive the value of the property. In contrast, yield capitalization considers income from multiple years in the future to derive a value for the property. Both of these techniques rely on income and a measure of future possible uncertainty and risk to determine value.⁷² Given that the purchase of most single-family homes is for use by an owner-occupant, the income approach is a less frequently used method for determining value. However, if a property is leased, farmed or otherwise income-producing, then the income approach may be the best method for determining value. In *Parr v. Aruba*, for example, Mr. Parr baled hay and raised and sold cattle for meat on his farm while the litigation was ongoing.⁷³

Even in cases where the property is not income-producing, the use of an income approach may be appropriate. For example, if a single-family home relies on a water well for drinking water to maintain the household, and the well becomes unusable, then a logical conclusion would be that the owner would have to find an alternative source of water.⁷⁴ If the only alternative is to truck in water and store it on site, then the owner could be compensated for the perpetual costs of the water delivery. This approach may be of particular value to plaintiffs claiming "loss of use" damages.

The process for determining a cost today that represents all the future costs is called "discounting" and is shown in the table below. The example

⁷¹ APPRAISAL INST., *supra* note 68, at 439–559.

⁷² Nick French & Laura Gabrielli, *Discounted Cash Flow: Accounting For Uncertainty*, 23 J. PROP. INV. & FIN. no. 1, 2005, at 75–89.

⁷³ Bob Buckel, *Trial Gets Underway: Parr v. Aruba Takes Center Stage in Dallas Courtroom*, WEATHERFORD COLLEGE (Apr. 12, 2014), <http://www.wcmessenger.com/2014/news/trial-gets-underway-parr-v-aruba-takes-center-stage-in-dallas-courtroom/>.

⁷⁴ For further discussion of the EPA's findings regarding water safety, see Ben Wolfgang, *EPA Finds Fracking Poses No Direct Threat to Drinking Water*, WASH. TIMES (June 4, 2015), <http://www.washingtontimes.com/news/2015/jun/4/epa-fracking-doesnt-harm-drinking-water/>. Although water contamination cases proliferate, the EPA study determined that fracking has "no 'widespread, systemic impacts on drinking water'" while also identifying "several 'potential vulnerabilities' in the fracking process and . . . several instances in which spills at drilling sites found their way into water supplies." *Id.*

is not truly perpetual, for simplicity it is only a forecast for the next 100 years, without consideration for years beyond that point.

Cost of Trucked water today per month \$ 800
 The cost is expected to increase per year by 3.0%
 Rate at which money can be invested 3.5%

	Next 12 months	Year 2	Year 3	Year 4	Year 5	Year 100
Annual cost of Water	\$ 9,600	\$ 9,888	\$ 10,185	\$10,490	\$10,805	\$ 79,125

Today's value	\$736,989
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In the above example, the \$736,989 cost in today's equivalent money represents the amount of money that would need to be invested at a long-term rate of 3.5%⁷⁵ in order to provide enough money each year to pay for the cost of having water trucked in. The example assumes that the current cost of water is \$800 per month and that the costs will increase by 3.0%⁷⁶ per year.

Clearly, this approach is potentially applicable in cases where there is an ongoing deficiency in the property. This would be less appropriate in a situation where a one-time remedy is available.⁷⁷

C. Cost Approach

The premise of the cost approach is that a buyer would not pay more for a property than what it would cost to build the property.⁷⁸ In the application of the approach, the appraiser determines the value of the land, then determines the cost to construct the improvement, and finally considers the deduction required for economic depreciation (since the cost of construction is for new improvements and the subject property likely has improvements that are not new). Depreciation is an estimate that considers losses in economic value that can result from multiple sources, including building deterioration and detrimental impacts to the property from both internal and external forces.

⁷⁵ This also provides an assessment of the potential risk and uncertainty in the future.

⁷⁶ The three percent used is an estimate of future inflation in the cost of water and delivery. These costs could potentially increase much faster if the overall demand for water in an area increases.

⁷⁷ For example, a damaged fence repaired with a one-time expense would render the property whole again.

⁷⁸ APPRAISAL INST., *supra* note 68.

This approach is very useful in valuing single-family homes because the concept is simple and is something that buyers in some areas consider.⁷⁹ It is less likely for a buyer in an urban, densely developed area to evaluate the appropriate purchase price of a home based upon how much it would cost to buy the land and build a new home. This is due to the lack of available land in a built-up urban environment. However, remodeling or tearing down and rebuilding are options.

In a rural area, where most fracking cases arise, it is more common for buyers to make the comparison between purchasing an already built home and buying land to build on their own, as was the case for the Parr family.⁸⁰ In these cases, the cost approach is highly appropriate in determining the market value of a home. “Market value is ‘what a willing buyer under no compulsion to buy will pay to a willing seller under no compulsion to sell.’”⁸¹ As shown below, the cost of the improvements would be added to the cost or value of the land and then depreciation would be deducted to compensate for improvements that are not in new condition or for elements that are no longer desirable.

Cost of land	\$200,000
Cost to build (new)	\$250,000
less: Depreciation (for improvements that are not new)	(\$75,000)
Value	\$375,000

When there is an issue surrounding diminution of value, the cost approach is very applicable if the cost to cure can be determined. The simple logic is that if a property is physically damaged, the loss in value should match the cost of repair, plus potential inconvenience costs. This approach is less useful when there is an ongoing or permanent problem, such as

⁷⁹ According to Dotzour, this approach is less reliable than the sales comparison approach and tends to overestimate the value in single-family homes. This research is specifically related to the valuation of homes under normal market conditions and does not test the value of the cost approach in situations where detrimental conditions may exist. Mark Dotzour, *An Empirical Analysis of the Reliability and Precision of the Cost Approach in Residential Appraisal*, 5 J. REAL EST. RES., Spring 1990, at 73.

⁸⁰ Brief of Appellee, *Aruba Petroleum, Inc. v. Parr*, 2016 WL 503291 (Tex. App. Feb. 5, 2016) (No. 05-14-01285-CV).

⁸¹ *Houston Unlimited, Inc. Metal Processing v. Mel Acres Ranch*, 443 S.W.3d 820, 831 (Tex. 2014), *reh'g denied* (Oct. 24, 2014) (quoting *French v. Occidental Permian Ltd.*, 440 S.W.3d 1, 3 (Tex. 2014)).

permanent contamination of a water well, unless the approach is combined with the income approach as in the previous example.⁸² In fracking cases, because the environmental damages are frequently “irreversible once a well is fracked,” appraisers are unable to rely exclusively on this approach.⁸³

All three of these approaches can be useful in situations where there is damage that has left a property less than whole and the property cannot be repaired to return it to its “whole” state. The essential comparison is to value the property in an “unimpaired” state and then value the property “as is,” or an “impaired” state.⁸⁴ The difference between these values is the loss. Additionally, there may be a cost to the loss of use of the property, which may be temporary or permanent.

D. Does Psychological Stigma Result in a Measureable Decrease in Property Value?

Despite the divergent opinions concerning whether fracking, indeed, causes property damages, homeowners have argued that the location of wells nearby has a detrimental impact on their property values due to fear, or psychological stigma, associated with the practice of hydraulic fracturing. Indeed, scholars have opined that “fracking” is an “f-word,”⁸⁵ noting that “the power of the word itself . . . may frame the issue for jurors in a way that is arguably prejudicial.”⁸⁶

⁸² The cost of repair is generally a measure of damages for a temporary nuisance, as this method rests on the assumption that the condition creating the nuisance can be fully abated. See *C.C. Carlton Indus., Ltd. v. Blanchard*, 311 S.W.3d 654, 663 (Tex. App. 2010) (“The terms ‘permanent’ and ‘temporary’ have also been key in determining the appropriate measure of damages in property-damage cases, that is, whether the appropriate measure of property damage is repair cost and lost rent (temporary) or lost market value (permanent).”).

⁸³ *Diné Citizens Against Ruining Our Env’t v. Jewell*, 2015 WL 4997207, at *1 (D.N.M., Aug. 14, 2015).

⁸⁴ RANDALL BELL, ORELL C. ANDERSON & MICHAEL V. SANDERS, *REAL ESTATE DAMAGES: APPLIED ECONOMICS AND DETRIMENTAL CONDITIONS* 19–21 (2d ed. 2008).

⁸⁵ Goldberg et al., *supra* note 44, at 16 (“The initial emotional response of the naive juror to the word ‘fracking’ may be implicitly influenced by its similarity in spelling and sound to the vulgar verb/adverb/interjection known as the ‘f word.’ Jared and Seidenberg have demonstrated that visual and phonological similarities both create identification and confusion over meaning. The ‘f word’ is usually considered obscene and harsh, and is associated with ‘anger, contempt, or disgust. Attitude transfer has been documented with other associations, such as attitudes toward ads and brands.”) (internal citations omitted).

⁸⁶ *Id.* (citing *Hiser v. XTO Energy, Inc.*, 768 F.3d 773 (8th Cir. 2014)).

Stigma⁸⁷ can be thought of as market resistance in real estate appraisal terms and relates to the real or perceived additional risk by the market. Empirically determining the loss in value as a result of market resistance is difficult when a property has not been sold. The process of determining how much loss in property value a home has from market resistance can be subjective, and thus fails to meet rigorous standards imposed for reliable expert testimony when adequate data is not available.

Some courts have made physical, discernible damage a prerequisite to recovery for stigma damages. They require plaintiffs seeking to recover for “diminution in value of real property resulting from the marketplace fear or stigma . . . [to] establish that the property sustained a physical injury as a direct and proximate result of the negligent conduct.”⁸⁸ For example, consider a home that has been determined to have a mold problem as a result of a leaking roof. Based upon the market, the home value is \$625,000 assuming it did not have a mold problem (Unimpaired Value). The owner has an estimate of \$75,000 to repair the roof, remove and remediate the mold, and bring the home to normal condition. If we assume that the repair cost⁸⁹ includes the owner’s displacement cost, loss of use, and all other costs, then the home’s “as is/impaired” value is \$550,000 (\$625,000 - \$75,000).

Unimpaired home value	\$ 625,000
Cost to repair	\$ 75,000
Impaired Value	\$ 550,000
Home sale price	\$ 495,000
Market Resistance (difference)	\$ 55,000

If the owner sells the home without making any repairs and the home sells for \$550,000, then there is no stigma or market resistance. However, if

⁸⁷ According to USPAP “environmental stigma” is formally defined as “[a]n adverse effect on property value produced by the market’s perception of increased environmental risk due to contamination.” UNIFORM STANDARDS OF PROFESSIONAL APPRAISAL PRACTICE 147 (2010–2011).

⁸⁸ *Smith v. Kan. Gas Serv. Co.*, 169 P.3d 1052, 1062–63 (Kan. 2007) (class action alleging negligence and nuisance brought by landowners claiming property values declined due to natural gas explosions resulting from gas leaks caused by negligent maintenance and operation of a nearby natural gas storage facility denied recovery because property did not suffer physical injury).

⁸⁹ The example shown is a simplification of an actual calculation of loss. Loss in value is addressed in USPAP Advisory Opinion 9 stating that simply considering the cost to repair does not adequately recognize the potential loss that the market may perceive and attribute to the property. See UNIFORM STANDARDS OF PROFESSIONAL APPRAISAL PRACTICE, *supra* note 87, at 147.

the owner sells the property without making repairs and the property sells for less than \$550,000, in this case \$495,000, then there is market resistance to the idea of mold. This shows that the buyer wants a discount of \$55,000 beyond the cost to repair the property. This is the stigma or market resistance cost attached to the property as a result of the past mold existence. In some situations, the loss from market resistance can be several times the actual cost of remediation.⁹⁰

This example is straightforward since the sale information is available. However, if the property has not yet sold or there is no intention of selling in the short-term, then the existence of market resistance is not immediately known and it is impossible to precisely calculate. The appraiser will have to rely on other sales in the past that had stigma (market resistance) discounts as part of the transaction and will have to estimate the subject property's level of resistance.⁹¹ In many situations, this is accomplished through market surveys and other qualitative measures rather than quantitative analyses.⁹² Case studies of past market resistance are often used when a property has not sold and there is no intention of selling.⁹³ In *Parr*, plaintiffs alleged that “[t]he property damage claim was based on diminution in value created by the stigma of the nuisance The stigma was created without the need for specific property damages.”⁹⁴

The potential loss in value as a result of market resistance can be exacerbated by the overall market conditions at the time.⁹⁵ In weak markets, the discount resulting from market resistance may be greater than in times

⁹⁰ See generally Robert A. Simons & Ron Throupe, *An Exploratory Review of the Effects of Toxic Mold on Real Estate Values*, 73.2 APPRAISAL J. 156 (2005).

⁹¹ See Alfert et al., *Recovering “Stigma” Damages in Mold-related Construction Defect Cases: Making the Property Owner Whole*, FLA. BAR J., June 2005, at 78 for a discussion on the problems with estimating loss as a result of stigma and the need to consider the market perceptions in totality, rather than simply adding up the individual components that could have potentially led to the loss in market value.

⁹² See Alfert et al., *supra* note 91.

⁹³ Michael Sanders, *Post-Repair Diminution in Value from Geotechnical Problems*, 64 APPRAISAL J. 59, 61 (1996).

⁹⁴ Brief of Appellant, *Aruba Petroleum, Inc. v. Parr*, 2015 WL 7308038 (Tex. App. Nov. 9, 2015) (No. 05-14-01285-CV).

⁹⁵ In addition to the degree of the discount needed from market conditions, the permanence of the discount can be affected by the market conditions and the media exposure of the detrimental condition. A broader discussion of risk assessment and permanence is provided by Sanders, *supra* note 93, at 59–66.

when the overall market values are increasing.⁹⁶ This is due to the expectations of risk that the potential buyers perceive.⁹⁷

The availability of stigma damages places at the front and center “the ‘conflicting goals of fully compensating the plaintiff for her injury while only awarding those damages that can be proven with reasonable certainty.’ Even when it is legally possible to recover stigma damages, it is often legally impossible to prove them. Evidence based on “conjecture, guess or speculation” is inadequate to prove stigma damages, not only as to the amount of the lost value but also as to the portion of that amount caused by the defendant’s conduct.”⁹⁸

E. Can External Forces or “Externalities” Impact Property Value?

Lawsuits relating to loss of value in property often incorporate an element of loss as the result of factors that are external to the property itself. If incurable, this is a form of permanent depreciation to the value of the property.⁹⁹ This depreciation is often confused with an externality.

An externality is a change outside of the property itself that can either increase or decrease the value of the property.¹⁰⁰ For example, a new park built near a home may increase the desirability of the area and therefore the value of the home. The home benefits from this positive externality. In contrast, a new industrial complex built next to an existing home, thereby reducing the desirability of the home, may negatively affect the value of the home. Additional externalities could be changes in the overall economic market,¹⁰¹ changes in interest rates, or changes in preferences. The difficulty is disaggregating these larger market changes to determine the influence of one externality over another.

An external force that affects the property or home in a direct way, such as a tree falling onto the property from a neighboring property, would be

⁹⁶ See Sanders, *supra* note 93, at 59–66.

⁹⁷ *Id.*

⁹⁸ Houston Unlimited, Inc. Metal Processing v. Mel Acres Ranch, 443 S.W.3d 820, 827 (Tex. 2014), *reh’g denied* (Oct. 24, 2014) (citing Gray v. Southern Facilities, Inc., 183 S.E.2d 438, 444 (S.C. 1971); Jennifer L. Young, *Stigma Damages: Defining the Appropriate Balance*, 52 S.C. L. REV. 409, 410–11 (2001)).

⁹⁹ Natural Gas Pipeline Co. of Am. v. Justiss, 397 S.W.3d 150, 155 (Tex. 2012).

¹⁰⁰ THEORY AND MEASUREMENT OF ECONOMIC EXTERNALITIES (Steven A.Y. Lin ed., 2014).

¹⁰¹ William C. Wheaton, *Real Estate “Cycles”: Some Fundamentals*, 27 REAL EST. ECONOMICS 209 (1999).

considered an encroachment. This could reduce the value of the property since homebuyers do not generally desire fallen trees on their property. In the case of a fallen tree, the loss in value would likely be relatively simple to determine. It may simply be the cost to remove the tree and repair any damage. The issue of loss becomes more difficult to assess when the encroachment is not curable.

To offset damages alleged in cases of fracking contamination, defendants can cite community-wide property value increases resulting from the entrance of fracking and its attendant industry, jobs, and development. The argument has been made that local property values increase as a result of the fracking operations and, if there are subsequent value losses to particular properties, the increase resulting from the improved economic conditions should be factored in to mitigate damages payable by an energy company defendant. This, in essence, is making an argument that the externality created by the fracking operation should be captured by the fracking operator, rather than the individual property owner. Taking this line of thinking to completion could result in an argument that all value created by others should be absorbed by others. By extension, the *argumentum ad absurdum* would be that the value of fracking to obtain natural gas in the United States is a result of the reduction of production in other countries. Therefore, other countries should be able to capture part of the revenues generated in the United States, because their lack of production is what increases the value of the gas produced in the United States. For this reason, appraisers do not factor in externalities when computing decreases in market value.

V. CONCLUSION

Appraisers attempting to assess a decrease in property value attributed solely to a specific defendant's fracking activities face unique challenges in the context of fracking and similar environmental contamination cases. In *Houston Unlimited, Inc. Metal Processing v. Mel Acres Ranch*, for example, the Texas Supreme Court concluded that expert testimony utilizing a percentage-reduction approach was "incompetent" to support a judgment for

plaintiffs.¹⁰² The appraiser in *Houston Unlimited* relied on a percentage-reduction approach after being unable to find comparable properties to serve as a basis for her analysis.¹⁰³ Plaintiffs in the fracking arena face similar difficulties.

There is no one perfect solution to determining the value of real estate or the loss in value. The appraiser must consider all of the possible approaches to value and let the evidence provide guidance on how to value a property. In many cases, appraisers may use multiple approaches to conclude a value. Reconciling multiple values is not a simple averaging exercise; it requires a consideration of the quality and quantity of the data, and the applicability of the approach. The key to any quality opinion of value is that the opinion is defensible and justifiable.

As the proliferation of hydraulic fracturing continues, it is likely that situations necessitating the use of real estate valuation techniques will increase. Establishing a set of accepted techniques and methods to determine value loss will become increasingly important. One of the main difficulties at this time is the determination of the “unimpaired” value when an entire community may become “impaired” due to widespread contamination. Complete reliance on conventional methods, like the cost approach, may not fully capture the extent of the loss in value due to the potential permanence or long-term impacts of fracking contamination. Therefore, yield capitalization may become the most relevant approach as best practices are established. Market resistance (stigma) will also pose a challenge in the near-term since the long-term impacts of fracking are not yet fully known. Therefore, the market does not know how to assess the potential risk. Case studies of market resistance to fracking will take time to develop, potentially leading to greater market resistance and the accompanied increase in diminution awards in the near-term.

¹⁰² *Houston Unlimited, Inc. Metal Processing*, 443 S.W.3d at 831.

¹⁰³ *Id.* at 830.