Surveys, Market Interviews, and Environmental Stigma

by Thomas O. Jackson, PhD, MAI

This edition of "Environment and the Appraiser" addresses the use of surveys and market interviews in analyzing the effects of environmental contamination on real property. The focus continues to be on the appropriate use of the methods and techniques for contaminated property valuation that were introduced earlier in this column.[1] As in the previous column,[2] the requirements and limitations of each method are generally discussed and illustrated. Then the results of market interviews concerning a previously contaminated property are compared with findings from sale price analyses of properties similar to the subject.

Surveys have been proposed and used as methods for measuring the market's perceptions of environmental risk. For instance, through a national survey of commercial and industrial real state lenders, Jackson demonstrated the reductions in adverse perceptions of environmental risk by mortgage lenders as contaminated, source-site properties are remediated to appropriate regulatory standards.[3] In addition, surveys have been presented as a method for establishing a causal link between observed changes in market values—measured through standard appraisal methods including case studies, paired sales analyses, and multiple regression analyses—and the presumed source of the loss in value.[4] In other words, the surveys were reportedly used to determine whether an observed loss in property value was due to a contamination source rather than some other cause, but not to measure the change in value.

There are important distinctions between surveys and market interviews, which are discussed later. Market interviews, referred to as market surveys, have been discussed by Bell as "secondary or supporting documentation for market data"; he states that only "in some unusual circumstances," such as a unique environmental condition, should this technique be used in "determining the impact, if any, of a detrimental condition."[5] Bell's assertions generally support the way in which surveys were used by Flynn et al.,[6] where property value impacts were determined through standard appraisal methods, and surveys were used to understand and interpret the sales data analysis.

Perceived Environmental Risk and Stigma

Environmental risk and stigma are often misunderstood terms, and appraisers sometimes misinterpret their relationship. In Advisory Opinion 9 (AO-9), "The Appraisal of Real Property That May Be Impacted by Environmental Contamination," these terms are defined as follows:[7]

> **Environmental Risk.** The additional or incremental risk of investing in, financing, buying and/or owning property attributable to its environmental condition. This risk is derived from perceived uncertainties concerning: 1) the nature and extent of the contamination; 2) estimates of future remediation costs and their timing; 3) potential for changes in regulatory require-

1. Thomas O. Jackson, "Methods and Techniques for Contaminated Property Valuation," *The Appraisal Journal* (October 2003): 311–320.
2. Thomas O. Jackson, "Case Studies Analysis: Environmental Stigma and Monitored Natural Attenuation," *The Appraisal Journal* (Spring 2004): 111–118.
3. Thomas O. Jackson, "Environmental Risk Perceptions of Commercial and Industrial Real Estate Lenders," *Journal of Real Estate Research* 22, no. 3 (2002): 271–288.
4. James Flynn et al, "A Survey Approach for Demonstrating Stigma Effects in Property Value Litigation," *The Appraisal Journal* (Winter 2004): 44.
5. Randall Bell, *Real Estate Damages: An Analysis of Detrimental Conditions* (Chicago: Appraisal Institute, 1999), 27.
6. Flynn et al.
7. Appraisal Standards Board, Advisory Opinion 9, "The Appraisal of Real Property That May Be Impacted by Environmental Contamination," 2004, Lines 1-191 (Washington, DC: The Appraisal Foundation, 2004).

ments; 4) liabilities for cleanup (buyer, seller, third party); 5) potential for off-site impacts; and 6) other environmental risk factors, as may be relevant.

Environmental Stigma. An adverse effect on property value produced by the market's perception of increased environmental risk due to contamination (see Environmental Risk, above).

Accordingly, the adverse effect referred to as environmental stigma is linked to the market's perception of increased environmental risk due to the noted factors and variables. Surveys and market interviews that have been properly constructed and implemented can address the extent to which the market perceives an increased environmental risk due to an environmental condition or issue. Although surveys and market interviews are useful for this purpose, these tools are not valuation methods or approaches. The actual measurement of the reduction in market values should be accomplished with one or more of the accepted valuation methods for this purpose, such as case studies analysis, paired sales analysis, and income capitalization analysis. This is consistent with additional guidance in AO-9, which defines the measured effect on property value as follows:

Diminution in Value (Property Value Diminution). The difference between the unimpaired and impaired values of the property being appraised. This difference can be due to the increased risk and/or costs attributable to the property's environmental condition.

Thus, the portion of the reduction in property values due to increased risk, or environmental stigma, is a function of the difference between the unimpaired and impaired market values, and these two values must be estimated through recognized appraisal methods and techniques as well as specialized valuation methods for this purpose.[8]

In summary, despite the conceptual link between the property value effect known as environmental stigma and the market's perception of environmental risk, the actual measurement of the reduction or diminution in property values should be accomplished through accepted appraisal techniques and methods. Adverse perceptions do not always lead to reductions in property values, and there is not a lock-step relationship between perceptions and actual market behavior. These adverse perceptions must be borne out in actual, measurable market behavior as reflected in the sale prices of properties, consistent with the "most probable sale price" definition of market value.

Overview of Surveys and Market Interviews

There is some confusion among appraisers concerning the differences between surveys and market interviews. In social science research, the term "survey" is implicitly used to mean "sample survey."[9] A sample survey, by definition, focuses on a representative sample of a population.

Market interviews, on the other hand, are more closely akin to what appraisers refer to as sales confirmation or verification interviews. They focus on a select group of key market participants, which in some cases may be the entire population or market for a particular property type and location. These key market participants may be selected because of their knowledge of a particular property type or market area. Both surveys and market interviews can provide useful insights concerning the market's perceptions of environmental risk. However, for the results of such research techniques to produce valid and reliable findings, they must be carefully planned and implemented. A general overview of each technique is presented below.

Survey Research

Sample surveys are frequently used to gauge opinions and perceptions concerning a range of topics from political issues to consumer sentiment. These surveys have also been reliably used to assess the perceptions of the market concerning environmental contamination and environmental risk.[10]

In order to produce valid and reliable results, surveys must be carefully designed and implemented. A properly designed survey will contain questions that present the concepts that the survey is addressing in an understandable and unbiased manner.[11] For example, if the survey is focused on environmental risk perceptions of lenders, there must be clear and specific questions in language and context

8. Jackson, "Methods and Techniques for Contaminated Property Valuation."
9. Earl Babbie, *Survey Research Methods,* 2nd ed. (Belmont, CA: Wadsworth Publishing Company, 1990), 65.
10. Jackson, "Environmental Risk Perceptions of Commercial and Industrial Real Estate Lenders."
11. Don A. Dillman, *Mail and Telephone Surveys: The Total Design Method* (New York: John Wiley & Sons, 1978), 97–105.

understandable to lenders. One approach would be to ask about loan underwriting requirements under differing environmental conditions (property is free from any contamination; property is contaminated but in remediation; remediation is complete, etc.). Also important are the preconditions for the survey responses. For lenders, the credit worthiness of the borrower may be as important as the collateral value. This element could be controlled for in the survey by establishing a precondition that the hypothetical borrower is presumed to be credit worthy. Lastly, the questionnaire should be pretested with individuals that share the same characteristics as those to be sampled. After completing the proposed survey questionnaire, the pretest group could be interviewed to determine any unclear or ambiguous items, which then could be modified.

In implementing surveys, an important first step is to select an appropriate sample. The most respected and useful method of sampling is termed *probability sampling*, which posits that "a sample will be representative of the *population* from which it is selected if all members of the population have an equal chance of being selected in the sample."[12] The most common type of probability sampling is the *simple random sample*, in which numbers are assigned to each *sampling unit* (such as a household, homebuyer, lender, etc.) in a list, and then a set of random numbers are generated and used to select the sample from the *sampling frame* (list of sampling units).[13] The sampling frame can be generated from lists that correspond to the population that is to be studied. In the lender survey example, the population would be mortgage lenders and the sampling frame might be a list of lenders from the American Bankers Association that are involved with the evaluation of mortgage loans.

Once the survey questionnaire has been designed and pretested, and the sample has been selected, the survey is implemented using a mail or telephone procedure. In the telephone survey format, interviewers must be trained to maintain a neutral posture with respect to the issues being addressed in the survey. They should not react to responses in a manner that might influence the response. Interviewers should also be trained in addressing respondents' questions so as not to change the information to which the respondent is reacting.

In tallying the number of useful responses from either format, a *response rate* should be calculated. In a mail survey, the acceptable practice for calculating response rate is to omit all questionnaires that could not be delivered and divide the number of completed questionnaires by the net sample size.[14] A response rate of at least 50% is considered adequate for analysis and reporting.[15] Response rates lower than this are considered susceptible to *response bias*.

Finally, the survey results should be analyzed using acceptable statistical techniques that allow for the estimation of error rates for key survey items. These rates can be expressed as a range with an associated confidence interval. Most standard statistical software packages have the capacity to calculate these estimates.[16]

Market Interviews[17]

As previously explained, market interviews are not methods or techniques for valuing contaminated properties. Market interviews are useful for collecting and understanding the data and information necessary to apply other methods and techniques such as the variations of sales comparison analysis used in contaminated property valuation. Market interviews also provide information useful for estimating the market's requirements for environmental risk premiums in an income capitalization analysis. In an income capitalization analysis, these requirements can be expressed as required rates of return or as return premiums over unimpaired rates. Market interviews, by themselves are not an appropriate and credible valuation method or technique.

In planning and conducting market interviews, care should be taken not to introduce bias into the results. Important in this regard are

- selection of market participants to be interviewed;

12. Leslie Kish, *Survey Sampling* (New York: John Wiley & Sons, 1965).
13. Babbie.
14. Ibid., 183.
15. Ibid., 182.
16. The two most commonly used packages are the Statistical Analysis System (SAS®) and the Statistical Package for the Social Sciences (SPSS®).
17. This subsection is largely similar to the discussion in Jackson, "Methods and Techniques for Contaminated Property Valuation," 318. This material was also presented at the symposium on "Environmental and Property Damages: Standards, Due Diligence & Strategy," sponsored by the Centre for Advanced Property Economics and the Appraisal Institute, Toronto, ON (April 2002).

- development of unbiased information about the subject property and its environmental condition; and
- construction of a structured questionnaire and interview protocol that can be replicated.

Potential bias can be introduced whenever the information provided or questions asked are not objectively developed and presented. Individuals to be interviewed should be representative of typical market participants. In addition, the environmental and other information provided should be consistent with what is considered typical or normal market knowledge. Interviewees should be asked to assess the subject property in an unimpaired condition and in its impaired, contaminated condition. Differences between the two sets of responses will then reflect the effects of the property's environmental condition. Detailed notes and transcripts of interviews as well as all information provided to interviewees should be retained in the appraiser's workfile.

Market participants do not need perfect knowledge of environmental contamination such as what might be expected from a qualified environmental engineer who has performed detailed testing of a contamination source. A real estate market that has become knowledgeable of environmental influences on properties in the study area will either react or not react in its pricing decisions, based on its perception of the risk and potential impact of the contamination.

All situations of environmental contamination do not inexorably lead to a reduction in the pricing and value of real property. An appraiser must not assume that the market will react in a certain way to environmental contamination where the assumed reaction has not been clearly demonstrated in observed market transaction data. This is discussed below.

Revealed and Stated Preferences

Despite the link between the perceptions of risk and adverse impacts on value, the most convincing market data is developed from transactions of comparable properties with similar environmental conditions to the subject property, rather than from information gleaned though surveys or market interviews. Transactional data, including the observed sale price and other financial terms and conditions, reflect the "revealed preferences" of the market with respect to the environmental condition under study. Other information, such as a "stated preference" for avoidance of the environmental condition, are relevant to the extent that they are consistent with and are revealed by sales and transactions in the market, since these ultimately establish market value. If the stated and revealed preferences differ, as they frequently do, then the revealed preferences exhibited in sale price data should be given greater weight. As observed by the late William Kinnard over twelve years ago, "The results from survey analyses must be tempered with the knowledge that the expectation of events is almost invariably more negative and more sharply delineated, at least when [the events] are expected to affect oneself negatively, than is realized when the event occurs."[18]

From another perspective, the preference for transactional data over survey data is in part due to the hypothetical nature of surveys. The difference between stated intentions and actual behavior has been termed "hypothetical bias," or the "potential error due to not confronting the individual with a real situation."[19] Respondents to surveys are not faced with the consequences of their stated preferences, be it either the potential purchase of an allegedly impacted property or the foregone utility from not purchasing the property. The hypothetical nature of surveys "does not provide respondents with an incentive to reveal their true values because they do not have to bear the consequences of any answers they put in a survey."[20] The next section examines an actual case in which the stated and revealed preferences are compared.

Comparing Stated Preferences to Actual Sales

This section presents a case study involving a former gasoline service station site that had a leaking underground storage tank (LUST). The site is located in a medium-sized city in Florida and had been ground leased from its current owner by the operator of the gas station. At the termination of the lease, contamination was discovered and partially

18. William N. Kinnard, Jr., "Measuring the Effects of Contamination on Property Values: The Focus of the Symposium in the Context of Current Knowledge," in symposium proceedings, *Measuring the Effects of Hazardous Materials on Real Estate Values: Techniques and Applications* (Chicago: Appraisal Institute, 1992), 5.

19. Kristy E. Mathews and William H. Desvousges, "The Truth, the Partial Truth or Anything but the Truth: Survey Reliability and Property Valuation," presented at the symposium on "Environmental and Property Damages: Standards, Due Diligence & Strategy," sponsored by the Centre for Advanced Property Economics and the Appraisal Institute, Toronto, ON (April 2002).

20. Ibid., 9.

remediated. It was subsequently re-leased for another use. The site was placed in a special Florida program for LUST remediation cost reimbursement. The site was not fully remediated as of its 2001 date of value, though. An indemnification from a major oil company provides for any future remediation costs not borne by the Florida program.[21] Thus, any property value diminution would be due to perceived environmental risks (risk effects) rather than cost effects or limitations on the highest and best use of the site (use effects). As will be seen, a series of market interviews with local lenders indicated some reluctance to provide a mortgage loan on the property, yet actual sales of other former gasoline service station sites indicate that they sold at unimpaired prices. The purposes of this case study are (1) to illustrate the use of the market interview technique, and (2) to provide information concerning the issue of stated preferences obtained through interviews and revealed preferences indicated by sales.

Market Interviews

As previously noted, the proper application of market interviews involves three important elements: selection of participants to be interviewed, development of unbiased information about the subject property and its environmental condition, and construction of a structured questionnaire and interview protocol. In the example here, local lenders were selected on the basis of their activity in the market segment (location and property type) for the subject property. The information in Appendix A was presented to those interviewed, although some information has been omitted from the appendix in order to maintain confidentiality with respect to various issues. The questionnaire items used in the interviews are shown in Appendix B. The actual questionnaire included spaces for the interviewer to record responses as well as any additional comments. As previously explained, the market interview procedure is different from formal surveys but it is more structured than a typical sales confirmation or verification interview. The later usually focuses on obtaining or confirming facts about a transaction, whereas the market interviews discussed here attempt to gauge perceptions of environmental risk as operationalized by changes in loan underwriting and lending criteria.

Consistent with this framework, several interviews were conducted in 2001 that dealt with the perceptions of mortgage lenders with respect to the specific environmental condition and history of the subject property. After reviewing the property description and history (Appendix A), four lenders were asked whether the environmental condition described in the case study would deter them from making a loan secured by the property.

If the subject property's environmental condition was perceived as detrimental, the lender was asked about specific credit underwriting adjustments necessary to compensate for any increased risks. The lenders were asked to assume that the prospective borrower was otherwise creditworthy. The borrower's creditworthiness was important to all of the lenders.

The results of the lender interviews concerning their risk perceptions of the subject's environmental condition are summarized below.

Lender One. The first lender interviewed was a commercial loan officer with a local bank having a primary business base in commercial real estate lending. This lender reviewed the case study with a senior vice president at the bank who had with over 30 years' experience. Thus, the responses from this lender reflect the perceptions of both individuals. Over the past 12 months, this bank had closed over 100 commercial real estate loans, and these loans represent about 80% to 85% of the lender's total business. This is an active commercial real estate lender in the local area. This lender also indicated that they had previously made a loan on a local contaminated convenience store property.

The lender's initial reaction to the subject property and its condition was that a loan would be contingent on the completion of the planned remediation—"a timing issue." However, after considering the fact that the buyer/borrower would not be responsible for clean-up costs and that the existing lease income would continue during remediation, the lender indicated that a loan could be made, but perhaps at a reduced loan-to-value (LTV) ratio, requiring additional equity or other collateral from the borrower. The lender concluded by noting that they "haven't walked away from 'dirty' sites (in the past)."

Lender Two. The second lender interviewed was a senior vice president with a smaller locally based bank.

21. Appendix A contains a detailed environmental history of this property.

This lender has 22 years of such experience and his institution did over $400 million in commercial real estate loans in the past year, representing about 40% of their total lending business.

With respect to the subject property and its environmental condition, this lender would prefer to wait 18 months until the remediation described in the case study had been completed. However, the lender would be willing to consider a mortgage loan on the property now, with a firm estimate of the clean-up costs and with these costs placed in escrow. Alternatively, if the Florida Department of Environmental Protection (FDEP) would approve of natural attenuation and monitoring as an appropriate remediation strategy, then a market loan could be made now. Current commercial property loan rates and terms would be an interest rate of prime to prime plus 0.5% (about 7.5%), a 15-year amortization period, and a 3-year term.

Lender Three. The third lender interviewed was with a major regional financial institution that had previously held a mortgage on a property adjoining the subject. The local loan officer for this bank reviewed the environmental case study for the subject property and responded that with the state program and an agreement by the major oil company to provide the balance of the clean-up costs, the environmental issues would not preclude lending on the property (they "can get over [the environmental risks]"). However, the loan officer indicated that an environmental policy officer in another city reviews all loans at their bank involving environmental issues, so the case study was sent to that individual and a second interview was conducted.

When the environmental specialist was asked whether the subject property's environmental condition would deter financing, the specialist responded "no, absolutely not," and that they could "mitigate risks/concerns." This individual was very familiar with the state cleanup reimbursement program, rankings, and similar sites. The policy officer also had previous experience with the major oil company and believed the company to be very responsible in its cleanup of former LUST sites. The officer said that the lender "would be absolutely interested" in loaning on this property and that they "have done contaminated property loans" in the past.

The officer noted that the use of the site for commercial purposes was important, and that it would probably not be appropriate for residential use given its condition. In addition, the officer was interested in seeing recent groundwater sampling data from the site and said that the contamination in such an old plume had "probably degraded." The lender also noted various environmental insurance products that are available to mitigate environmental risks.

Lender Four. The fourth lender interviewed was a vice president with the local office of a major national financial institution. The lender's initial reaction to the environmental case study on the subject property was that they would not be interested in providing mortgage financing until the property was remediated. However, the lender "may take a look" at the property in its current status. There was concern that the environmental testing data on the subject was old, and would require a current assessment, such as the Site Assessment Report (SAR) described in the property description and history (Appendix A). Once the remediation was complete in 18 months, they would not be deterred from making a mortgage loan secured by the subject property. In addition, if a passive natural attenuation plan was approved by the FDEP, then that would reduce risks so that current market financing would be available. In the meantime, other collateral would be required.

In summary, the results of the case study market interviews present a mixed picture for the subject property. The property would not be treated the same as a comparable but uncontaminated property. However, the lenders indicated that with some adjustments, there were ways to mitigate the risks and provide financing for the property in its current condition. One of the four lenders—the one with the greatest experience with these issues—was confident that a solution could be found to provide a mortgage loan on the property in its current condition, but here again, additional steps to mitigate risks would be needed. The lenders agreed that an approved passive remediation strategy would remove these risks now. They also agreed that the property could be financed at the conclusion of the 18-month remediation period.

Comparison to Sales Data

This section presents sale price analyses whereby sales of unimpaired properties are matched and compared to sales of impaired properties with environmental conditions similar to the subject. The objective is to determine if the observed prices of the im-

paired properties are supported by the prices of otherwise similar unimpaired properties. Two impaired property sales were selected.

Former Gasoline Service Station Site (Impaired Sale One). This is the sale of a 0.59-acre parcel (25,596 square feet) located several blocks south of the subject property on the same road. The property was a former gasoline service station that had a LUST that had been removed along with the other tanks. According to documentation in the files of the county pollution control department, which administers the Florida petroleum clean-up program under contract with the FDEP, no further assessment was required as of December 1999.

The site was purchased in July 1999 for $768,000, or $30.00 per square foot. The unit price for this property is within the market range for comparable properties without environmental issues. Three sales of comparable properties without environmental issues were analyzed.

The first (Sale 1-1) was the December 1999 sale of 1.015 acres (44,200 square feet) for $1,330,000, or $30.09 per square foot. This property is north of the impaired sale site. With a larger size (inferior) and a corner location (superior), this property has a net comparison similar to the impaired sale site.

The second unimpaired comparable (Sale 1-2) was the sale of 2.28 acres in May 1998 for $2.5 million, or $25.17 per square foot. This property is larger (inferior), triangular shaped (inferior), and further north of the central business district (CBD) (inferior) than the impaired sale property, accounting for its lower unit price.

The third unimpaired comparable (Sale 1-3) was the March 1999 sale of 0.56 acre for a unit price of $34.35 per square foot. This property is close to the CBD (superior) and south of the Impaired Sale Two property, accounting for its higher unit price.

The market range of $25.17 to $34.35 tightly brackets the price for Impaired Sale One of $30.00 per square foot, indicating a market transaction price for the LUST site. In addition, the impaired sale property was reported to be under contract for a price near $1.0 million in 2001, a significant increase over its 1999 price of $768,000. These sales can be summarized in a relative comparison array as follows:

Sale	Unit Price	Net Comparison (Comment)
1-3	$34.35	Superior (location closer to CBD, rectangular shape)
1-1	$30.09	Similar (inferior size, superior corner location)
Former LUST Site	$30.00	Impaired Sale One
1-2	$25.17	Inferior (larger, triangular shape, further north)

Former Gasoline Service Station Site (Impaired Sale Two). This sale involved a site of 4.66 acres, or 202,990 square feet, with frontage on the same road as the subject. The property, a former gasoline service station with a LUST, was sold in 1998 for $3.5 million, or $17.24 per square foot. The site was purchased for development with a drug store. As confirmed with parties to the transaction, there was ongoing remediation at the site when it sold and during its redevelopment. There were no reported indemnifications for future environmental liabilities. In addition, documents for the site indicate that there were "areas of hydrocarbon impact in groundwater at the site," as well as "excessively contaminated soil, as defined in Chapter 62-770, F.A.C."

Despite these seemingly adverse environmental conditions and the fact that the site was not fully remediated at the time of sale, its sale price of $17.24 per square foot is well bracketed by market sales data for the unimpaired properties and appears to have been unaffected. This conclusion is based on a comparison with four otherwise similar unimpaired sales.

The first unimpaired comparable (Sale 2-1) was the sale of 2.67-acre parcel, also for development as a drug store. The site is located on the same road, and was sold in December 2000 for $975,000, or $8.38 per square foot. Although similar in use and purpose, this lower unit price reflects its slightly inferior exposure and location relative to the former gasoline station site, which has strong exposure and access from two highways.

The second unimpaired comparable (Sale 2-2) is the sale of 1.93 acres in February 1999 for a unit price of $21.41 per square foot, and located in an upscale area to the south of the former gasoline station site. This site was also purchased for development as a drug store. Its higher price reflects its superior location.

The third unimpaired comparable sale (Sale 2-3) was the sale of 5.5 acres across a major highway from Impaired Sale Two. This site was acquired by its current owner in June 2000 for $5.50 per square foot. Its lower unit price reflects its secondary corner location (inferior). However, its location in the immediate vicinity of Impaired Sale Two and lower price provides further indications of a lack of any discounts in the impaired sale price for impaired sale site.

Lastly, the fourth unimpaired comparable (Sale 2-4) is the sale of 1.925 acres in September 1998 for $11.51 per square foot. The commercial/retail site was subsequently developed for a branch bank and an auto service facility. The lower price relative to Impaired Sale Two can be attributed to its inferior corner location and to the fact that the road on which it is located is not a through street. These sales can be summarized in a relative comparison array as follows:

Sale	Unit Price	Net Comparison (Comment)
2-2	$21.41	Superior location (upscale area)
Former LUST Site	$17.24	Impaired Sale Two
2-4	$11.51	Inferior (weaker intersection)
2-1	$8.38	Inferior (secondary location, not on main intersection, became drug store)
2-3	$5.50	Inferior (secondary corner, not at main intersection)

As can be seen, the unit price for Impaired Sale Two (the former gasoline station/LUST site) is bracketed by unimpaired market transaction data and prices. There is no market evidence that the price paid for the former LUST site was discounted or reduced due to its environmental condition. Indeed, its price is above that paid for sites in its immediate vicinity and for another site to be similarly developed as a drug store.

The foregoing analyses of impaired property sales involving former gasoline service station sites that had LUSTs indicate that the impaired property sale prices were consistent with market-level pricing. No discounts were observed or are evident in this data. The impaired property sale prices are well supported by market comparables that did involve leaking tanks. The findings of these analyses do not show any effect on sale prices as a result of previous contamination from LUSTs. There was no sale price evidence that the properties with LUSTs had been adversely affected.

Conclusion

The market interviews and sale price analyses present slightly conflicting results with respect to whether the subject property's environmental conditions would impact its unimpaired market value.[22]

The market interviews of lenders indicated some reluctance to provide mortgage financing prior to completion of the planned 18-month remediation plan. A closer examination of their responses reveals that certain elements reduced their perception of increased environmental risk. Risk-reducing elements existed where the potential/hypothetical borrower not responsible for the estimated remediation costs; the property was entered into the Florida program for reimbursement of remediation costs; there was an existing stream of lease income; and the indemnification from the major oil company with whom at least one of the lenders had previous dealings. One of the lenders would make the loan with the existing conditions, one would not, and two might make a loan if additional details could be worked out. All of the lenders indicated that they would make a loan on the property once the remediation had been completed (the after-remediation stage).[23] Interestingly, two of the lenders indicated that if the monitored natural attenuation plan were approved for the site, they would

22. The unimpaired value of the property had been separately estimated at $30 per square foot, or $900,000 for the 30,000-square-foot site.

23. See discussion of remediation lifecycle in Thomas O. Jackson, "Appraisal Standards and Contaminated Property Valuation," *The Appraisal Journal* (April 2003): 130–131; and Jackson, "Environmental Risk Perceptions of Commercial and Industrial Real Estate Lenders."

make the loans available immediately, a finding consistent with that presented in the previous "Environment and Appraiser" column.[24]

On the other hand, the sale price analyses indicated no reluctance or resistance by the market in the acquisition of former gasoline service station sites that previously had LUSTs. In the analyses, both impaired property sales occurred at unit prices that were supported by prices of otherwise similar but unimpaired property sales. Further, one of the LUST sites was acquired prior to completion of planned remediation, a condition similar to the subject.

The appraisal issue then becomes the reconciliation of the stated reluctance of the market to finance the acquisition of the subject property with its environmental condition, and the actual market behavior as evidenced in the sales data. A likely explanation is that in an actual transaction, many of the issues that initially invoke concern are dealt with in other ways. For example, one of the lenders indicated that environmental insurance might mitigate the risks.

Also, and perhaps more importantly, as a potential transaction works its way though the lenders' and buyers' due diligence process, more information is accumulated with respect to the contamination, its remediation, liabilities, and costs. More information generally equates to less uncertainty and less risk. It is the unknowns that result in higher risk and uncertainty in markets that can be characterized as risk adverse.

Lastly, it is difficult to re-create all of the conditions of an actual transaction in a market interview or survey, even for the most carefully structured interview or survey. This underlies the preference for actual transactional data over survey/interview data for purposes of analyzing the effects of contamination on market value.

Thomas O. Jackson, PhD, MAI, CRE, is the president of Real Property Analytics, Inc. in College Station, Texas, where he specializes in analyzing real property that may be impacted by environmental contamination. In addition, he is an executive professor in the Department of Finance of the Mays Business School at Texas A&M University, where he teaches real property valuation in the Land Economics and Real Estate Program. Jackson also is a former member of the Appraisal Standards Board. **Contact: T 979-690-1755; E-mail: tomjackson@real-analytics.com; Web site: www.real-analytics.com**

24. Jackson, "Case Studies Analysis: Environmental Stigma and Monitored Natural Attenuation."

Appendix A: Subject Property Description and History

Property Description

The subject property consists of a rectangular site of approximately 30,000 square feet, located at the corner of a major six-lane divided highway and a paved two-lane road. Access is provided via curb cuts from both roads. The site has 200 feet of frontage along the highway, with good visibility to passing traffic 150 feet along the two-lane road. The surrounding neighborhood consists of commercial highway-oriented development, and the market in the immediate area appears strong. The site is improved with asphalt paving, planters, and fencing, and it functions as part of a car dealership. The owner of the site leases it to a tenant, who owns the adjoining parcels. The site has been so leased since 1993, and current renewals extend the lease arrangement through 2004. (The date of value was in 2001.) The lessee has agreed that future rent payments would not be affected by any remediation activities.

Environmental History and Condition

A major oil company leased the subject property from its current owner from 1970 to 1990, during which time the site was used as a gasoline service station. In 1988, petroleum hydrocarbon contamination was discovered in the soils at the property. In May and June 1990, underground storage tanks and contaminated soil were removed from the site. The excavation remained open until April 1991 to allow volatilization of some residual contamination. In 1991, the backfilled area was re-excavated and backfilled with wash rock for better compaction. Additional contaminated soil was also excavated at that time and treated on site. The soil was removed from the site in September 1992.

A Contamination Assessment Report (CAR) was submitted in 1993, with CAR Addendums (CARAs) submitted in 1993 and 1994. The CAR reports, approved by the Florida Department of Environmental Protection (FDEP) in May 1994, established the presence of hydrocarbon compounds in groundwater at the site. A Remedial Action Plan (RAP) was submitted to the FDEP in 1995. The RAP included groundwater recovery, treatment via an air stripper tower, and on-site reinjection. Natural attenuation was recommended for residual soil contamination. Annual monitoring of all on-site monitoring wells was also proposed. Based on the size of the contaminant plume, the time required to clean up the groundwater was estimated to be 18 months. Consultants estimated $160,000 in clean-up costs for an air sparging and soil vapor extraction system operating for 18 months. However, no additional remediation systems had been activated as of the date of value.

The site was accepted into the Florida Early Detection Incentive (EDI) program in 1989 and received partial reimbursement for expenses incurred during the Initial Remedial Action program. However, the site ranking was not high enough to warrant further funding for proposed remedial activities through the EDI program from 1995 to 2000. As of the date of value, Florida's program had been extended to sites whose priority ranking had previously been too low for clean-up funding. Accordingly, the property is eligible to receive funding for additional remediation. In the event that Florida EDI approves only partial reimbursement of future costs, the major oil company that had previously leased the site from its current owner would finance the balance of remediation costs. Current proposals are for additional soil investigation and submission of a Site Assessment Report (SAR), which will summarize current site conditions and recommend the next appropriate course of action. The estimated remediation costs may be revised following submission of the SAR.

Appendix B

Assume that you are contemplating providing an acquisition or refinance loan with the subject property as collateral, and assume that the applicant is creditworthy.

I. Lending Opportunity
   1) In general, (as of the date of value) assuming no history or existence of contamination:
      1) What interest rate or range would you charge for financing the purchase of the property described in the case study?
      2) Would you require the buyer to pay any points?
      3) What would be the required loan to value ratio?
      4) What would be your minimum required debt coverage ratio?
      5) Over what period would the loan be amortized?
      6) What would be the term of the loan?
   2) What type of due diligence would you require on the subject property?
   3) As of (the date of value):
      1) Would the environmental history and condition of this property prevent you from committing to acquisition fiancing?
         (a) If yes, why?
         (b) If no, would the environmental history and condition of this property impact the terms of the mortgage? Why?
         (c) If yes, which of the following would change?
         Interest Rate _____
         Discount Points _____
         AmortizationPeriod _____
         Term _____
         Debt Coverage Ratio _____
         LTV ratio _____

II. Company Policy
   1) Does your bank have a policy with regard to contaminated properties? If so, briefly, what is it and how long has it been in place?
      1) If not, what guidelines do you use to evaluate contaminated real estate?
   2) Are you familiar with any loans that your bank has considered for acquisition financing of environmentally contaminated property?
      1) If so, when were they considered?
      2) Did you extend or deny the loans? Why?
      3) What is your title?
      4) What are your general responsibilities?

III. Lending Characteristics
   1) During the past 12 months, approximately how many loans has your bank made on (properties similar to the subject) for acquisition financing?
   2) What percentage of your real estate loans are made on property in, or competitive with the (market area of the subject property)?