

# When Good Things Happen to Bad Properties

by Thomas O. Jackson, PhD, MAI

**M**ost studies of the effects of environmental contamination on property values have focused on the adverse consequences of contamination on the market value of the impacted properties.<sup>1</sup> For example, a recent book, *When Bad Things Happen to Good Property*, presents a litany of adverse consequences associated with the effects of contamination on real property and discusses these issues in the context of litigation claims for damages.<sup>2</sup> Another recent book, *Real Estate Damages: Applied Economics and Detrimental Conditions*, presents a series of case studies that catalog adverse effects of contamination and other detrimental conditions on property values.<sup>3</sup> What is largely missing from published studies is discussion of the recovery of market value as contaminated properties move through the remediation process, and environmental risk and stigma are reduced or eliminated.

## Environmental Stigma and the Remediation Lifecycle

The potential effects of contamination on property values are not constant over time, and may change as a contaminated property is remediated. This change in effects, as a property moves through remediation, is anticipated in the valuation framework set forth in Advisory Opinion 9: "The Appraisal of Real Property That May Be Impacted by Environmental Contamination" (AO-9) and is discussed in *The Appraisal of Real Estate*, 13th edition.<sup>4</sup> AO-9 defines the *remediation lifecycle* as

A cycle consisting of three stages of cleanup of a contaminated site: before remediation or cleanup; during remediation; and after remediation. **A contaminated property's remediation lifecycle stage is an important determinant of the risk associated with environmental contamination.** Environmental risk can be expected to vary with the remediation lifecycle stage of the property.<sup>5</sup> (Emphasis added.)

Environmental risk is linked to the frequently misunderstood concept of *environmental stigma*, which is "an adverse effect on property value produced by the market's perception of increased environmental risk due to contamination."<sup>6</sup> The importance of these concepts for the recovery of market value in a contaminated or previously contaminated property is that the influence of risk and the stigma effect decline over the remediation lifecycle. As discussed next, studies have found diminishing stigma effects over time, especially as a source property is remediated.

## Empirical Evidence of Recovering Property Values

### Recovery of Value of Proximate Property

The issue of recovered or recovering property values has been addressed in several studies and articles on the effects of contamination on property values and prices. While this was not the primary focus of the studies, early literature on the effects of contamination found such diminishing effects. For example, in analyzing the effects of the Three Mile Island nuclear

1. Thomas O. Jackson, "The Effects of Environmental Contamination on Real Estate: A Literature Review," *Journal of Real Estate Literature* 9, no. 2 (2001): 93–116.
2. Robert A. Simons, *When Bad Things Happen to Good Property* (Washington, D.C.: Environmental Law Institute, 2005).
3. Randall Bell, *Real Estate Damages: Applied Economics and Detrimental Conditions*, 2nd ed. (Chicago: Appraisal Institute, 2008).
4. Advisory Opinion 9: "The Appraisal of Real Property That May Be Impacted by Environmental Contamination," Appraisal Standards Board, *Uniform Standards of Standard Appraisal Practice 2008–2009* ed. (Washington, D.C.: The Appraisal Foundation, 2008); and Appraisal Institute, *The Appraisal of Real Estate*, 13th ed. (Chicago: Appraisal Institute, 2008), 226.
5. AO-9, Lines 92–95.
6. AO-9, Lines 84–85.

disaster, Gamble and Downing reported that local realtors perceived a “virtual collapse of the market” immediately following the accident, but after four to eight weeks they observed that sales volume had returned to nearly preaccident levels.<sup>7</sup> For the period immediately following the accident, Gamble and Downing found little impact on sale prices, but did find an effect on marketing time, although this effect was temporary.

Studies of potential property value impacts from landfills have also noted diminishing adverse impacts over time. McClelland, Schulze, and Hurd found that while risk perceptions associated with living in proximity to a landfill were associated with reduced property values, these effects were significantly reduced (by over half) after closure of the landfill.<sup>8</sup> Kohlhasse studied thirteen Superfund hazardous waste sites in the Houston area and found that adverse property value effects were reduced or eliminated subsequent to the remediation of the hazardous sites.<sup>9</sup> Temporary effects also were found by Wise and Pfeifenberger in their study of a Superfund landfill site in Ohio. They reported that the initial 10% decline in values for surrounding properties lessened steadily over time, even though the landfill site had not been fully remediated.<sup>10</sup>

The change in property values after cleanup was also addressed by Dale et al., who used regression-based hedonic pricing models to examine housing before, during, and after cleanup of a smelter site in Dallas, and to evaluate the extent to which prices may rebound following remediation.<sup>11</sup> Their study found that during the period before cleanup, prices of houses farther away from the site were significantly higher than prices for houses closer to the site; but in the after-remediation period, prices for housing closer to the site rebounded relative to other

locations. (Interestingly, the study also found that rebound prices for houses closer to the site were slightly higher than for other houses.)

### **Recovery of Value of Contaminated Property**

Another set of studies focused on the recovery of prices and value of contaminated industrial properties. An analysis comparing sale prices of previously contaminated industrial properties with otherwise similar but uncontaminated properties in Southern California found no difference in their pricing.<sup>12</sup> In that analysis, the prices of the previously contaminated properties were bracketed by the price range of the uncontaminated comparables. In addition, a regression analysis of the same sales along with a larger number of uncontaminated property sales found a price premium for the previously contaminated properties, although this premium was not statistically significant. One explanation for the premium is that the previously contaminated properties had been tested and remediated to applicable regulatory standards and a great deal was known about their environmental condition relative to properties that may not have undergone such extensive testing. Another analysis, which included contaminated industrial properties sold prior to cleanup, found a statistically significant price discount before remediation and no adverse effects following cleanup.<sup>15</sup>

A related set of studies focused on contaminated commercial properties (retail centers) in Southern California before and after cleanup.<sup>14</sup> Initial findings from an analysis of 75 retail center sales from 1997 to 1999, including 16 contaminated or previously contaminated sites, indicated price discounts of approximately 20% prior to cleanup, with a statistically insignificant price premium after completion of re-

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7. Hays B. Gamble and Roger H. Downing, “Effects of Nuclear Power Plants on Residential Property Values,” *Journal of Regional Science* 22, no. 4 (1982): 457–478.
  8. G. H. McClelland, W. D. Schulze, and B. Hurd, “The Effect of Risk Beliefs on Property Values: A Case Study of a Hazardous Waste Site,” *Risk Analysis* 10, no. 4 (1990): 485–497.
  9. Janet E. Kohlhasse, “The Impact of Toxic Waste Sites on Housing Values,” *Journal of Urban Economics* 30 (July 1991): 1–26.
  10. Kenneth T. Wise and Johannes P Pfeifenberger, “The Enigma of Stigma: The Case of the Industrial Excess Landfill,” *Toxics Law Reporter* (March 1994): 1435–1441.
  11. L. Dale et al., “Do Property Values Rebound from Environmental Stigmas? Evidence from Dallas,” *Land Economics* 75, no. 2 (1999): 311–315.
  12. Thomas O. Jackson, “The Effect of Previous Environmental Contamination on Industrial Real Estate Prices,” *The Appraisal Journal* (April 2001): 200–210.
  13. Thomas O. Jackson, “Environmental Contamination and Industrial Real Estate Prices,” *Journal of Real Estate Research* 23, no. 1/2 (2002): 179–199.
  14. Thomas O. Jackson, “Environmental Risk Premiums and Price Effects in Commercial Real Estate Transactions” (paper presented at the 21st Annual American Real Estate Society Meeting, Santa Fe, NM, April 2005); Thomas O. Jackson, “The Effects of Environmental Contamination on Commercial Real Estate Prices and Income Capitalization Rates” (paper presented at the 18th Annual American Real Estate Society Meeting, Naples, FL, April 2002).

quired remediation.<sup>15</sup> An analysis of the same sales, focusing on income capitalization rates, found an environmental risk premium of 255 basis points over unimpaired capitalization rates prior to cleanup and almost no difference (-7.2 basis points) after cleanup. With an expanded data set, including 120 total sales with 25 contaminated or previously contaminated sales from 1997 to 2004, the impacts were reestimated.<sup>16</sup> The findings of this analysis indicate price reductions from 15.9% to 16.9% for the contaminated sites sold prior to cleanup with no effect for previously contaminated sites sold after remediation. By including the more recent sales, the capitalization rate risk premium decreased to 197 basis points (from 255 basis points). These findings indicated that even for properties sold prior to remediation, the market's perception of environmental risk, and the resulting stigma effect, have been declining over time.

### **Macalloy Site Environmental Case Study**

To further illustrate the change in property value over time as a contaminated site is remediated and restored to useful condition, we turn to a case study involving the redevelopment of industrial brownfield site in South Carolina.

The case study site consists of approximately 144 acres located in North Charleston, South Carolina. The waterfront industrial site, referred to as the Macalloy site, was acquired in February 2005 for \$12 million. At the time of the 2005 sale, the property was contaminated; remediation was underway but had not yet been completed. The site sold again on March 2007 for \$33 million after the planned remediation activities had been completed. In the intervening period of approximately two years, there were site improvements in addition to the remedial activities, which improved the property's condition.

The Macalloy site had been previously improved with an industrial manufacturing facility that produced ferrochromium alloy. The facility was operated by The Macalloy Corporation until 1998 when it

ceased operations, reportedly due to competitive pressures. The ferrochromium alloy production process involves smelting iron and chromium in submerged electric arc furnaces. This results in a weapons-grade alloy for high-grade stainless steel used by the U.S. Department of Defense. According to U.S. Environmental Protection Agency (EPA) documents, the slag (waste) from this process, containing hexavalent chromium and cadmium, had been deposited throughout the Macalloy site as fill material and had been used to construct an on-site impoundment area referred to as an unlined surface impoundment (USI).<sup>17</sup> In addition, the site had fine particulate matter ashes and dust (PMAD) from airborne emissions.<sup>18</sup> It was estimated that approximately 60,000 cubic yards of soil had been contaminated with hexavalent chromium, some of which leached into the groundwater at hazardous concentrations.<sup>19</sup> Two groundwater plumes of hexavalent chromium were identified at the site, one of which extended into adjacent surface water.

### **Site Remediation and Improvements**

In 1997, pursuant to a consent order with the South Carolina Department of Health and Environmental Control (SCDHEC), Macalloy initiated off-site disposal of the PMAD. After the plant closed in 1998, Macalloy, the EPA, and the SCDHEC decided that mechanisms under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) would be more appropriate to achieve site remediation.<sup>20</sup> The Macalloy site was put on the National Priorities List (NPL or Superfund List) in February 2000. A Remedial Investigation/Feasibility Study was approved by the EPA in June 2000, and the Final Phase II Remedial Investigation Report was approved in March 2002.<sup>21</sup> The remedial design was completed in September 2003, and in June 2004, the EPA entered into a consent decree with Macalloy and British Oxygen Corporation, a previous site occupant.

Remediation of the site began in October 2004.<sup>22</sup> Remedial activities included mixing the contaminated soils with a chemical agent that converted the hexava-

15. Jackson, "The Effects of Environmental Contamination on Commercial Real Estate Prices and Income Capitalization Rates."

16. Jackson, "Environmental Risk Premiums and Price Effects in Commercial Real Estate Transactions."

17. U.S. EPA, "NPL Site Narrative for Macalloy Corporation" (February 2000); U.S. EPA, "South Carolina NPL/NPL Caliber Cleanup Site Summaries."

18. "NPL Site Narrative for Macalloy Corporation."

19. U.S. EPA, "Superfund Proposed Plan, Macalloy Corporation Site, North Charleston, Charleston County, South Carolina" (U.S. EPA Region IV, April 2002).

20. Ibid.

21. "South Carolina NPL/NPL Caliber Cleanup Site Summaries."

22. Ibid.

lent chromium to a harmless compound as well as injections into the contaminated groundwater of a chemical agent that facilitated a similar reaction.<sup>23</sup> In addition, there was implementation of a comprehensive storm-water management system. These remedies were largely complete by September 2006.<sup>24</sup> The total cost of the remedial activities at the site was \$9.5 million, all of which was borne by the responsible parties and/or the governmental agencies involved in the cleanup.<sup>25</sup>

The buyer of the site in 2007 partnered with an experienced brownfield investor and developer. The general strategy for such investors/developers is to acquire sites at a significant discount, hold them during the remediation period, and then resell them at significant gain once the property's market value rebounds after cleanup.<sup>26</sup> This was the case with the Macalloy site, which was acquired for \$12 million in 2005 and resold in 2007 for \$33 million. However, not all of the increase in sale price was due to the property's improved environmental condition and initial price discounts. Reportedly, the buyer invested an additional \$14 million in the property during the intervening period for storm-water management (in addition to the amount allocated from the EPA consent decree/Superfund plan); roads and sewers; demolition of existing structures; construction of three buildings; and extensive work below the surface to remove the arc furnaces. The three new buildings, with an estimated cost of \$6.5 million, were built after the site was sold but their cost was included in the sale price. In addition, a parcel of 5.08 acres and 3.55 acres of public roadway (a total of 8.62 acres) within the site were not part of the 2007 sale, but had been part of the site when it was acquired in 2005.

### Case Study Sales Analysis

In analyzing the two sale transactions, the 2005 and 2007 prices should be adjusted to account for nonenvironmental differences in the size and condition of the property at the time of the transactions

as well as the general appreciation in the industrial property market.

First, the 2005 sale price of \$12 million can be adjusted for the 8.62 acres withheld from the 2007 sale by proportionately reducing its price for an adjusted price of \$11,218,617.<sup>27</sup> This price is then increased for general market appreciation of 1% per year over the 24-month period from the first to the second sale, resulting in an indicated value of \$13,989,205. This value is then increased by the cost of improvements to the site,<sup>28</sup> for a final adjusted 2005 price of \$21,489,000.

Next, the 2007 sale price of \$33 million is reduced by the cost of the buildings that were to be constructed after the sale, estimated at \$6.5 million, for an adjusted price of \$26,500,000. The net effect, though, is an increase in price and value of 23.3% for the two-year period (over and above the general property appreciation rate and in addition to site improvement costs). This increase in value could be attributed to the difference in the property's environmental condition in 2007 relative to 2005, since nonenvironmental factors were adjusted out of the comparison. Further, since the environmental remediation costs were paid through the Superfund mechanism, this price increase could be attributed to a reduction in the additional risk involved with purchasing the property in its improved 2007 condition relative to its 2005 condition. This is consistent with the investment strategy of brownfields investors, as noted, which is to buy at a discount, hold the property as it is remediated and regains its value, and then realize a significant gain on resale.

### Summary and Conclusions

There is ample empirical evidence that the adverse effects of environmental contamination on property values can be temporary, and that prices and values recover following remediation. Over the years, studies have found a consistent pattern of a rebound in prices of previously impacted residential, commercial, and industrial properties following

23. Interviews with U.S. EPA Remedial Project Manager.

24. Craig Zeller, *Superfund Preliminary Close Out Report, Macalloy Corporation NPL Site, [North] Charleston, South Carolina* (U.S. EPA Region IV, September 2006); and interviews with U.S. EPA Remedial Project Manager.

25. Interview with U.S. EPA Remedial Project Manager.

26. Thomas O. Jackson, Mark E. Dobroski, and Trevor E. Phillips, "Analyzing Contaminated Real Estate in a Changing Market," *The Real Estate Finance Journal* 13, no. 2 (1997): 67-72; Thomas O. Jackson, "Investing in Contaminated Real Estate," *Real Estate Review* 26, no. 5 (1997): 38-43.

27. Dividing \$12 million by the 143.99 acres sold equals \$83,339 per acre. Multiplying this by 8.62 acres equals \$718,383.

28. This is the difference between the total improvements' cost of \$14 million and the \$6.5 million for the buildings that had not been built. The building cost will be deducted from the 2007 price, as will be explained.

the remediation and cleanup of the contamination source. This pattern reflects the increased knowledge about the sites and their environmental condition, the resolution of environmental compliance issues, and the positive effect of this in reducing perceptions of environmental risk and uncertainty.<sup>29</sup> As a site is remediated, the adverse effect referred to as environmental stigma diminishes and in many cases goes away altogether. The environmental stigma effect, therefore, may be considered a temporary rather than permanent effect.

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29. The decrease in perceived risk by commercial real estate lenders and investors has also been well documented; see Thomas O. Jackson, "Environmental Risk Perceptions of Commercial and Industrial Real Estate Lenders," *Journal of Real Estate Research* 22, no. 3 (2001): 271–288; and Thomas O. Jackson, "Groundwater Contamination and Real Estate Investment Risk," *Journal of Real Estate Practice and Education* 8, no. 1 (2005): 115–131.