APPRAISING "ENVIRONMENTALLY CHALLENGED" REAL ESTATE FOR TAX PURPOSES

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INTRODUCTION

The authors describe how the value of real estate is affected by environmental contamination and the methods of evaluating properties affected by environmental liabilities and contamination. An additional section will describe how future environmental liabilities can be amortized in a discounted cash flow analysis, thus reducing the value of the property. How these costs are handled can have a dramatic effect on the value of the property, hence a similar effect on the amount of property taxes that should be paid.

THE CHANGING ENVIRONMENTAL CLIMATE

The appraisal of contaminated real estate has become perhaps the most contentious subject in the appraisal industry. Published articles by respected professionals reach diametrically opposing conclusions about the seriousness of the problem. In the courtroom, appraisers working for the plaintiffs and defendants express opposite opinions concerning the damages caused by contamination despite using the same facts.

In the appraisal of an ordinary office building or plot of land, the appraiser has decades of industry experience on which to draw. The methodology is very straightforward and fairly rigid. The competent appraiser needs only to follow the guidelines in a careful, thorough manner in order to provide a worthwhile value estimate and other information to his or her client.

On the other hand, the valuation of contaminated real estate is still a relatively new field. The environmental movement first gained notoriety in the 1960s, but prolonged, nationwide attention to how environmental contamination affected people's homes and businesses really began with the Love Canal disaster in 1976, followed by publicity of the health hazards of asbestos in buildings and lead in paint and gasoline. A wave of new local, state and federal laws followed, banning some substances and more strictly regulating others. More important for the appraisers and attorneys, these new laws provided a framework for the cleanup of already contaminated sites and for determining which parties would have legal responsibility. Of course, these new laws did not magically eliminate contaminated sites, nor was there consensus on who should pay for the cleanups. These issues are still the subjects of intense debate.

For the appraiser, this continuously shifting environment presents unique problems. For example, during the 1980s, the public perceived asbestos-containing building materials to be an extremely serious health problem, which they are, but no differentiation was made between friable and non-friable asbestos. The demand was often for complete (and extremely expensive) abatement, regardless of whether the particular form of asbestos posed a serious health threat. Now, the public and market participants seem to have a better understanding of the risks involved. For example, asbestos-containing floor tile is usually covered with a new layer of tile rather than being removed. The cost is far less, and the difference in risk is negligible.

Appraisers have to stay abreast of this changing climate because it has profound effects on their evaluation of a property. They (as well as the attorneys involved in such cases) must

have a solid functional knowledge of biology, engineering and remediation techniques. They must also understand that the same type of contamination affects different properties in different ways and that the public perception of the seriousness of contamination is not static.

Just like the courts, lawyers and public at large, the appraisal community has differing opinions on how severely, if at all, some forms of contamination affect real property values. This paper will discuss the different methods appraisers use to evaluate contaminated properties, the advantages and disadvantages of each, and present a case study of a particular property.

WHAT IS STIGMA?

Since engineers determine remediation techniques and costs, the primary role of the appraiser is to estimate damages from stigma. In the Journal of Environmental Law and Practice, June 1996, stigma is defined as "the reduction in market value of a property caused by contamination resulting from the increased risk associated with the contaminated property.

Stigma results from:

(1) the risk that the estimate of remediation costs understates the actual remediation costs;
(2) the risk that even after remediation has been completed to the satisfaction of the governing environmental authorities;
    (a) the highest and best use will be less advantageous than the unimpaired highest and best use and/or
    (b) the risk that the subject property may continue to suffer a diminution in value in the marketplace resulting from such factors as mortgage discrimination;
(3) the risk that purchasing the subject property would expose the buyer to strict joint and several liability under such laws as CERCLA;
(4) the risk that purchasing the subject property may expose the buyer to public liability;
(5) the risk that the net cash recovery from a seller/owner, third party or a remediation cost reimbursement program may be less than the actual costs incurred by the purchaser including such costs as attorney's fees;
(6) other factors such as fear that would negatively impact on the market value of a property, and;
(7) limited to include only those impacts on market value that are not quantified in the development of remediation costs."

Despite the length of the definition, stigma is a somewhat vague term and is difficult to quantify, particularly when the property is threatened by the possibility of contamination but its physical presence is not yet existent. This problem is paramount when it involves litigation. To some, a mere reduction in market value is insufficient cause of action. Contamination must be present on site. Texas courts have yet to address this issue in a published opinion.

Nonetheless, the appraiser's function is to estimate that reduction in market value. In various publications, appraisers have recognized two forms of stigma: proximity stigma and residual stigma. Proximity stigma is the consequence of being near a contaminated site. Property losses result from the fear of future contamination and concerns about incompatibility with a pollution source that will degrade the neighborhood. Residual stigma involves a permanent loss in value in a contaminated property. The property never recovers to its original, unimpaired value. Residual stigma is often an expression of the public's desire to avoid legal and financial risks.

The following section discusses the various methods for evaluating contaminated real estate.

APPROACHES TO VALUE

Appraisers have typically used the Income Approach or the Sales Comparison Approach to estimate the real property damages caused by contamination. In brief, the Income Approach involves determining the market rent for a property, then dividing that rent by a capitalization rate to determine the property value. The Sales Comparison Approach involves finding properties similar to the subject properties that have sold recently, then adjusting for variations between those sales and the subject.

Some real estate appraisers and scholars favor the Income Approach. The basic method for contaminated properties is to determine the rental rate for the contaminated property and compare it to the rates of similar, uncontaminated properties. The difference in rental rates, once capitalized, provides the estimate of damages from the contamination. This technique is valid and can provide an easy-to-follow, mathematical quantification of environmental risk.

Unfortunately, the conclusions are infrequently substantiated by market data. Commonly, the appraiser finds no difference in the rental rates between contaminated and uncontaminated properties and determines that no damage has occurred. Superficially, this seems logical, but the appraiser's mistake is that he has assumed that the market is well informed and that the rental transactions meet the criteria of market value, when in fact they often do not.

Despite the increased attention paid to environmental hazards, only rarely is a community genuinely well informed of environmental risks associated with contaminants within their neighborhood. The most notable exception is if the site of concern is so hazardous that it qualifies for listing on the EPA's National Priority List (NPL) and is classified as a Superfund site. But even in Superfund sites, only limited objective information may be available to the public. We have found examples of contaminated rental properties in close proximity to a Superfund site in which the owners knew of the contamination but did not inform the renter. An analysis considering only rental values would indicate no damages, whereas more careful scrutiny might indicate quite the opposite. Likewise, a generic rental survey assumes that the people living in a contaminated area have plenty of choices of where to live. In truth, contamination often occurs in the poorest neighborhoods, where people live because they have no alternative.

The Income Approach is therefore often criticized as being strictly theoretical and lacking real world contact with the market, especially with losses from intangible factors such as stigma. To bolster their assessment of no damages, appraisers often include surveys of brokers, lenders and investors. But our research indicates that many of these people actually have little to no experience in this field. Also, brokers understandably have no desire to broadcast information that could damage the market that provides their income. Surveys of real estate professionals with little real-world experience do nothing to substantiate the appraisers' conclusions.

The same problems occur in the Sales Comparison Approach. Some appraisers, finding no market transactions in the contaminated area, conclude that the subject property is unmarketable and property damages equal 100% of the unimpaired value. Once again, this seems superficially logical, but in truth the lack of transactions is often the result of market confusion and the lack of sound data on which to base buying and selling decisions. The lack of data may also be related to something entirely unrelated, such as a general economic downturn. For example, in the late 1980s, the most common transaction seemed to be a foreclosure or fire sale. Worthwhile market data was very rare, but that did not mean that all contaminated properties were worthless.

Conversely, we know of several cases in which market activity in a contaminated area is robust with no apparent difference from other neighborhoods. We have often found that knowledge of the contamination in the area is virtually non-existent. Thus, it calls into question whether

these transactions fit the criteria of a market sale with a fully informed and willing buyer and seller.

Either approach *can* be useful in determining the real property damages caused by contamination, but the analysis of the transactions involved must be much more thorough than a typical sales analysis. Otherwise, the appraiser, whose job is to be as fair and objective as possible, has not fulfilled his or her role.

The next section discusses the Case Studies Approach, which has become a valuable tool in analyzing contaminated properties.

CASE STUDIES APPROACH

The Case Studies Approach has evolved as part of the Sales Comparison Approach in estimating diminution in property value of real estate that has been affected by contamination. As real estate professionals have gained more information and experience with environmentally impaired transactions, they have adjusted their biases away from absolute rejection of a property. Sellers of contaminated properties have developed mitigation solutions including indemnification agreements, separation of surface and subsurface rights, future remediation/liability escrow and ground leasing. As a result of these measures, a small but increasing number of data is emerging in the form of sales, financing and leasing of contaminated real estate.

Most of the data researched involves slightly-to-moderately contaminated properties. The sales of more severely contaminated communities, such as Superfund sites and adjacent properties, are scarce, and the necessary research on them can be expensive and time-consuming to develop. Severely contaminated properties are the most rare; these sites usually have such a high risk of regulatory or third party liability that the current owners cannot or will not relinquish control. These properties may never sell on an arms-length basis to an informed, knowledgeable buyer because of pending litigation or enforcement proceedings. The first property to sell after being placed on the National Priorities List was a warehouse property in south Houston once contaminated with up to 158,000 times the EPA limit for TCE. In 1991, it sold to its current tenant for $150,000. As part of the settlement agreement between the federal government, the buyer, and the seller who had inherited the property from her father, the buyer was promised that the federal government would never take legal action against him. Even so, the seller indicated that the purchase price was only 50% of the unimpaired market

value. Also, the seller was compelled to turn over 50% of the proceeds to the federal government plus 40% of the proceeds of sales of *other, unrelated* properties in the estate. She noted that the total proceeds from her father's estate were about $900,000, of which she would have received $500,000 after taxes and legal fees. After settling this case with the government, she netted only $30,000.

As noted previously, some appraisers dismiss the Sales Comparison Approach by stating that the property is not marketable; thus, no sales are comparable to the subject property. While environmentally impaired properties are infrequent, the authors are convinced by observations over the last ten years that sales are occurring more frequently. Reasons for this include market familiarity, the quantification of environmental risks, and regulatory bodies offering the responsible parties more relief from future prosecution and remedial action through Risk-Based Corrective Action (RBCA) and Voluntary Cleanup Programs (VCP).

The Case Studies Approach is a process of comparing contaminated sales that are similar to the subject property. From these comparisons, the appraiser attempts to develop an understanding of how actual buyers and sellers have reacted to the following factors:

(1) discounts in selling price;
(2) risk of regulatory enforcement and third party litigation;
(3) on-going and future monitoring, sampling, testing, and other remediation liabilities;
(4) structural controls such as deed recordation requirements;
(5) medical monitoring costs and health claims or concerns; and,
(6) seller and purchaser indemnification requirements related to future conveyances of the property and subsequent recontamination discoveries.

In order to apply the results of case study research to the property being appraised, the analyst must understand the nature and extent of the contaminants present. Many questions must be answered by the appraiser and the team of consultants that may include geologists, hydrologists, professional engineers,
toxicologists, industrial hygienists and medical and veterinary doctors. The following are questions in the valuation assignment:

(A) What type of contaminants is involved? How are the contaminants characterized (hazardous or toxic waste, petroleum substances, non-hazardous waste, debris, etc.)?
(B) What are the principal sources of contamination?

(C) What are the contamination pathways (air, soil, groundwater)?

(D) Is the subject property currently contaminated, or will it be invaded by contaminants in the foreseeable future?

(E) What are the public health risks?

(F) What has been the history of the complaints and problems generated against the PRP including all the discharges, violations, fines, etc.? What is the likelihood of subsequent discharges at the point source based on the history of operations and on-going environmental controls?

(G) What is the potential for state or federal action? Who will be the target of the enforcement by the governmental agency?

(H) Is the client potentially a *de minimus* responsible party, owner, transporter or an innocent landowner?

(I) What type of testing, monitoring or surveillance work will be necessary to quantify the nature and extent of the contaminants present on site? How large is the plume of contaminants, and in what direction and speed is it moving?

(J) Based on the premise that no governmental action will be taken and the responsible party will not remediate the site, what mitigation measures and structural controls will be implemented by the property owner to increase or decrease the marketability of the property?

(K) If no action is taken by the PRP or regulatory agencies, how many years will it take for the contaminants to reach a concentration below background or maximum contaminant level (MCL) assuming biodegradation is possible?

(L) What actions, if any, can the adjacent, innocent landowners take toward remediation of their site and at what cost of money and time?

(M) In how many years will the subject site be remediated to background levels, or will deed recordation be required because remediation goals will not achieve background levels?

(N) If background levels of contamination are not the goal of the remediation, then what is the extent of remediation being sought and how will the eventual amount of contamination compare to background for properties in the area?

(O) Assuming no remediation work is required of the innocent landowner but contamination liability remains, how should the owner disclose this liability to third parties?

After the appraiser has assembled a group of contaminated case studies, he or she can develop some basic opinions. First, sites purchased with little-to-no concern of future reprisals by regulatory bodies or with a nominal, manageable remediation liability often command the smallest discounts. Purchasers of this type of property are unlikely to require a large stigma

discount. This may be especially true when the contaminants have not moved off-site and the remediation effort will result in an effective, permanent cure such as a closure letter from the applicable enforcement agency upon completion of the remediation project. Second, purchasers who manage similarly contaminated sites on a daily basis are less likely to negotiate large discounts on sites which will be continuously operated and exposed to future releases. A notable exception is major oil companies that are reluctant to purchase gasoline station sites that have been previously contaminated by on-site or off-site contaminants until they have been remediated to below regulatory limits. The dilemma for many purchasers of formerly contaminated real estate is that while a site may have been successfully remediated to the acceptance of state and federal regulations, it still may not satisfy mortgage lenders or subsequent purchasers. The result is that the property may never regain its mortgageability or original market value. Third, sites sold without regulatory closure or with off-site migration problems sell for substantial discounts or are not marketable at any price because the environmental and third party liabilities cannot be quantified. Fourth, some properties in demand because of a lack of substitutes often sell for lesser discounts. One such property is a large, heavy industrial plant. In these cases, purchasers are compelled to work with the site owners in spite of the contamination problems.

The sales of properties summarized in Exhibit A establish a range of diminution in value. The case studies suggest an appropriate discount in value for the subject property proportionate to the risks associated with the nature and extent of contaminants. The comparability of each case study is based on its similarity to the subject property's contamination problem. The contamination case studies may be drawn from diverse property types or land uses but can still be applicable to a subject property for the purpose of estimating stigma loss or total diminution in value. Typically, case studies with less severe situations than the subject property will normally indicate a smaller percentage of losses. Conversely, case study examples with the most severe problems will typically indicate the highest losses in value.

An argument against the Case Studies Approach is that market data has not yet developed to the extent that it can be used as the primary means of defending a property loss adjustment; however, appraisers have long utilized only a few data points for estimating market value. The industry standard for appraising single family homes has been three comparable sales. For commercial properties, five is usually acceptable. As always, the primary factor is not so much the quantity of data as the quality. When enough solid, supportable case studies which are analogous to the subject property have been developed, then this approach can be the primary

approach to quantify diminution in market value associated with owning contaminated real estate.

HYPOTHETICAL CASE STUDY

In 1984, Asleep at the Switch Corporation (ATS) purchased an industrial/warehouse facility for $1 million. No environmental assessment was performed prior to purchase. The property contained two underground storage tanks that had been used by the seller to store trichloroethane (TCE) since the 1950s. Prior to the sale in 1984, the seller removed the TCE from the tanks. The seller agreed to take responsibility for any environmental contamination on the property and provided an indemnity to ATS.

During 1989, ATS became aware of EPA rules and regulations concerning underground storage tanks. ATS asked the seller to remove the tanks from the property. All tanks were discovered to have been leaking, an incident report was filed and a LUST identification number was assigned to the site. The seller removed the tanks from the property and returned all excavated soils back into the tank pits.

In 1991, ATS reluctantly accepted classification as a responsible party (RP) by the state and federal regulators in order to spur the remediation process. Soon after, ATS requested state coordination of a corrective action program. The project was referred to the state's Hazardous Waste Agency.

In 1993, remediation activities began at the site. The Remedial Investigation (RI) report quantified approximately 1,000 gallons of TCE absorbed into the soil. The site was classified a Class 1 site (top priority / high risk to public health) because the leakage was within 1,500 feet of a drinking water supply. The RI also discovered a nearby dry cleaning facility that allegedly had a substantial TCE release. The industrial facility is down-gradient from the dry cleaner, but whether any commingling of contaminants has occurred has not been determined.

In 1994, the state agency's contractor installed an operations and maintenance system. An excavation as well as a pump and treat system was also installed at the site. In addition, the agency has proposed an elaborate trench and carbon filtering system along the property border that will recover and trap contaminants in the groundwater.

As of 1996, the State agency and its contractor have spent approximately $300,000 on the site, and the total remediation costs at the site were expected to be $1,500,000. The agency estimated five years of remediation may be necessary to achieve closure.

As of now, ATS is considering legal action against the seller and investigating whether the dry cleaner's TCE release has also contaminated its property.

CASE STUDY QUESTIONNAIRE

Estimate the total real property damages and environmental liabilities to the ATS property assuming the following facts:

- The original purchase price in the property thirteen years ago was $1,000,000. The current, unimpaired market value for the industrial/warehouse facility is $1,600,000.
- The remediation liabilities to date are $300,000. The estimated total remediation liabilities will be $1,500,000.
- ATS will incur approximately $200,000 in monitoring, risk assessment and disclosure (legal) costs in order to sell the property in five years. The costs are spread equally over five years and are in addition to any remediation costs. At a 5% discount rate, the present value of this cost is approximately $140,000.
- ATS has a contract to sell the industrial/warehouse facility upon completion of the remediation project in five years. The contract price is 50% of its unimpaired market value. At a 5% discount rate, the present value of this loss is approximately $625,000.
- The property owner is legally classified as an operator and a responsible party by state and federal agencies.

Note: The majority of current cases in this jurisdiction do not allow for recovery of remediation costs by innocent landowners who are not responsible for cleanup.

What is the market value of this property for advolrem tax purposes??
Which answer best reflects ATS's losses resulting from its exposure to this contamination?

a) 100% of the current, unimpaired market value of subject property **$1,600,000**

b) Estimated total remediation

liabilities	$1,500,000
Present value of monitoring and surveillance costs	140,000
	$1,640,000

c) Present value of loss from discounted future sale of property $625,000
Remediation liabilities to date 300,000
$925,000

d) Present value of loss from discounted future sale of property $625,000
Present value of monitoring, risk assessment and disclosure costs 140,000
Remediation liabilities to date 300,000
$1,065,000

e) Present value of loss from discounted future sale of property $625,000
Present value of monitoring, risk assessment and disclosure costs 140,000
Total expected remediation liabilities 1,500,000
$2,265,000

f) None of the above

AMORTIZATION OF FUTURE ENVIRONMENTAL COSTS

Large scale projects such as hazardous waste incinerators and landfills have inherent environmental risks. Therefore, they come under much closer scrutiny by government agencies than a typical property and are subject to special environmental costs. These costs are described below:

Permitting costs: The costs of permitting acquisition and renewal over the life of the facility. For example, the initial permit for a hazardous waste incinerator in Texas is for ten years and subsequent permits last five years.

Closure Costs: The costs associated with decontamination and removal of buildings, tanks, pipes, pumps, capping of landfills, etc., in a legal and environmentally sound manner.

Post-Closure Costs: The costs of monitoring the closed facility for environmental safety. Activities includes monitoring of groundwater and soil, maintenance of drainage, security

and report preparation. In the case of landfills and hazardous waste incinerators, the post-closure period is thirty years.

For just one facility, these costs can run into the ten of millions and even hundreds of millions of dollars. Whether these costs can be amortized and deducted from the value of the facility is of primary importance. It has been argued by county appraisal districts that these costs are strictly business expenses that cannot be deducted for property tax valuation purposes. We disagree. An example of a business expense is the malpractice insurance paid by a lawyer who is a tenant in an office building. The insurance cost does not affect the real estate; if the lawyer leaves the building, that cost goes with his firm. Conversely, although environmental costs are incurred because of a particular business activity, these costs accrue to the property itself - environmental costs cannot be transferred to a different property. Even if the property owner ceased or changed the business use of the site, most of these future costs would still have to be paid.

Section 23.14 of the State of Texas Property Tax Code backs up our opinion. Subheading (b) of this Section states that "in appraising real property that the chief appraiser knows is subject to an environmental response requirement, the present value of the estimated cost to the owner… is an appropriate element that reduces market value and shall be taken into consideration by the chief appraiser."

Property owners do not always take advantage of this situation. Often, the owner has not explored this avenue of potential tax savings because of the negative publicity surrounding tax protests and litigation. The publicity can be especially negative when the property is not particularly welcome in the community in the first place. Another problem is that by drawing attention to his or her own potential environmental problems, the owner risks third party litigation from nearby property owners, environmental groups or government regulators. The owner must thoroughly evaluate a the risks, costs and potential benefits of pursuing property tax relief under this Section of the Tax Code. Such an evaluation would involve legal counsel, environmental engineers, accounting/finance personnel and real estate appraisers.

As an example of what effect amortizing environmental costs has on property taxes, we present two discounted cash flow analyses of a fictional hazardous waste incinerator. For a variety of reasons, after what appeared to be a promising future at the beginning of the decade, this industry underwent drastic decline. Companies that spent hundreds of millions of dollars on one facility have faced huge operating losses or narrow positive margins that will never

recoup the original construction costs. Thus, the opportunity to save on property taxes is of critical importance.

The first spreadsheet displays the estimated value of the incinerator without considering environmental costs. For 1998, the plant is expected to gross $35 million and net $5 million. Revenues and operating expenses (not including property taxes) are expected to increase 3% annually. The operating discount rate is 15.0%, to which 2.5% was added to account for property taxes (assuming an assessed rate of $2.50 per $100 in value). The facility is expected to have a remaining economic life of 20 years. In this analysis, the facility has a value of approximately $30,107,000. Based on this value, 1998 property taxes on the facility should be approximately $753,000.

In the second evaluation, we have included the costs of permitting, closure and post-closure on an amortized basis. We have assumed that the cost of renewing the permit every five years is $1 million, closure costs for 1998 are estimated at $40 million and post-closure costs are $20 million. The amortization costs for each item were estimated as follows:

Permit fees: Enough money must be saved each year to build up to $1 million after five years. That money is then spent on the permit, and the process begins from zero. Using an earnings rate of 7% on the assumption that the money will be saved in a safe investment such as a U.S. Government bond, the annual amortization cost is $162,515.

Closure costs: The $40 million figure applies to what the costs would be if the facility were closed today, not in the future. Since we have assumed a 20-year remaining life, we must estimate the closure cost after 20 years. Assuming an inflation rate of 2.5%, that total cost is $63,946,007. Then, using the same earnings rate of 7%, we calculate the annual amortization cost needed to build up to $63,946,007 after 20 years. That annual amount is $1,457,785.

Post-closure costs: These are calculated in the same fashion as closure costs with one exception. Because the post-closure money will be spent over a longer period after the facility is closed, interest can still be earned on the unspent money. For the $20 million in post-closure costs, the annual amortization cost is $452,243.

The sum of these three cost items is $2,072,543 annually. Since the net operating income was only $5 million without these costs, the effect on the value of the property is dramatic. The

value estimate decreases from approximately $30,107,000 to $18,724,000, a decrease of 38%. Likewise, the estimate of what property taxes should be declines from $753,000 to $468,000. The annual net savings is $285,000. Over the life of the facility, the net present value of the annual savings is over $3 million.

DISCOUNTED CASH FLOW ANALYSIS #1 – River City Hazardous Waste Incinerator
(No amortization of future environmental liabilities)

Effective Date	Jan-1-1998
Expected Remaining Economic Life (Years)	20
Operations Discount Rate	15.0%
Property Tax Rate	2.5%
Effective Discount Rate	17.5%
Sinking Fund Earnings Rate (for Permit/Post-Closure Costs)	7.0%

Year	1 **1998**	2 **1999**	3 **2000**	4 **2001**	5 **2002**	6 **2003**
REVENUE	$ 35,000,000	$ 36,050,000	$ 37,131,500	$ 38,245,445	$ 39,392,808	$ 40,574,593
OPERATING EXPENSES	(30,000,000)	(30,900,000)	(31,827,000)	(32,781,810)	(33,765,264)	(34,778,222)
NET OPERATING INCOME	5,000,000	5,150,000	5,304,500	5,463,635	5,627,544	**5,796,370**
DISCOUNT RATE	0.8511	0.7243	0.6164	0.5246	0.4465	
PRESENT VALUE OF N.O.I.	$ 4,255,319	$ 3,730,195	$ 3,269,873	$ 2,866,357	$ 2,512,636	
CUMULATIVE PRESENT VALUE OF N.O.I.	**$ 4,255,319**	**$ 7,985,514**	**$ 11,255,387**	**$ 14,121,743**	**$ 16,634,379**	

CUMULATIVE PRESENT VALUE OF NOI		**$ 16,634,379**
VALUE OF FUTURE N.O.I. (REVERSION)		
N.O.I. in Year 6 (2003)	$ 5,796,370	
P.V. Annuity Factor (15 Years @ 17.5%)	5.2057	
Discount Rate (5 Years @ 17.5%)	0.4465	**$ 13,472,340**
PRESENT VALUE OF FACILITY		**$30,106,719**

PROPERTY TAXES FOR 1998	**$752,668**

DISCOUNTED CASH FLOW ANALYSIS #2- River City Hazardous Waste Incinerator
(Including amortization of environmental liabilities)

Effective Date	Jan-1-1998
Expected Remaining Economic Life (Years)	20
Operations Discount Rate	15.0%
Property Tax Rate	2.5%
Effective Discount Rate	17.5%
Sinking Fund Earnings Rate (for Permit/Post-Closure Costs)	7.0%

Year	1	2	3	4	5	6
	1998	**1999**	**2000**	**2001**	**2002**	**2003**
REVENUE	**$ 35,000,000**	**$ 36,050,000**	**$ 37,131,500**	**$ 38,245,445**	**$ 39,392,808**	**$ 40,574,593**
OPERATING EXPENSES	**(30,000,000)**	**(30,900,000)**	**(31,827,000)**	**(32,781,810)**	**(33,765,264)**	**(34,778,222)**
Permitting/Closure/Post-Closure Costs						
Amortization of Permit Costs	(162,515)	(162,515)	(162,515)	(162,515)	(162,515)	(162,515)
Amortization of Closure Costs	(1,457,785)	(1,457,785)	(1,457,785)	(1,457,785)	(1,457,785)	(1,457,785)
Amortization of Post-Closure Costs	(452,243)	(452,243)	(452,243)	(452,243)	(452,243)	(452,243)
TOTAL	**(2,072,543)**	**(2,072,543)**	**(2,072,543)**	**(2,072,543)**	**(2,072,543)**	**(2,072,543)**
NET OPERATING INCOME	**2,927,457**	**3,077,457**	**3,231,957**	**3,391,092**	**3,555,001**	**3,723,828**
DISCOUNT RATE	0.8511	0.7243	0.6164	0.5246	0.4465	
PRESENT VALUE OF N.O.I.	**$ 2,491,453**	**$ 2,229,032**	**$ 1,992,287**	**$ 1,779,050**	**$ 1,587,269**	
CUMULATIVE PRESENT VALUE OF N.O.I.	**$ 2,491,453**	**$ 4,720,485**	**$ 6,712,772**	**$ 8,491,822**	**$ 10,079,091**	

CUMULATIVE PRESENT VALUE OF N.O.I.		**$ 10,079,091**
VALUE OF FUTURE NOI (REVERSION)		
N.O.I. in Year 6 (2003)	$ 3,723,828	
P.V. Annuity Factor (15 Years @ 17.5%)	5.2057	
Discount Rate (5 Years @ 17.5%)	0.4465	**$ 8,655,187**
PRESENT VALUE OF FACILITY		**$18,734,278**

PROPERTY TAXES FOR 1998	**$468,357**

Annual savings when compared to DCF without amortization	**$284,311**

Present value of savings over life of facility	**$ 3,011,995**

CONCLUSION

In a perfect world, the appraiser would be able to use several techniques in the valuation of a contaminated property and choose which techniques were most relevant and accurate. Unfortunately, the location of and type of property usually dictate which approaches can be used. With fewer transactions and increased heterogeneity, commercial properties are better suited to the Case Studies Approach. The same limitations apply to most rural properties.

Another constraint is the large amount of time and money required to produce these analyses. Few clients have the resources to fund in-depth research of numerous sales of contaminated sales. The authors' experience is that extensive studies are researched over several years with several clients. As the database of contaminated property sales grows, it can be used repeatedly and more efficiently to satisfy each client's needs.

Scientific methodologies, assessments of risk and public perceptions are always changing. For example, the long term efficacy and perception of incipient programs such as the EPA's Brownfields initiative and the State of Texas' Voluntary Cleanup Program will become more apparent over time. The imperative of the appraiser is to continuously find new case studies and update older ones in order to keep up with prevailing trends. Only then can the appraiser continue to provide worthwhile information to the affected parties and to the public.