Chapter 6

Current Stigma Assessment Methods[1]

6.1 Introduction

In the eyes of a valuer, a contaminated property is no different from an ordinary property except that the property is polluted by one or more hazardous substances. The fact that the property is contaminated requires a valuer to have a thorough understanding of land contamination issues including regulations under relevant environmental laws, the nature of contamination on land, the type of remediation required, and the market condition, etc. As far as valuation is concerned, a number of methods, including conventional methods like direction comparison (Patchin 1994) and capitalisation method (Patchin 1988, Mundy 1992b & c, Neustein 1992, Dixon 1996), and alternative methods such as environmental balance sheet method (Wilson 1992), survey method (Greenberg & Huges 1993, McLean & Mundy 1998), multiple regression analysis (Dotzour 1997, Reichert 1997), option pricing method (Lentz & Tse 1995), mortgage-equity analysis (Chalmers & Jackson 1996), Monte Carlo simulation method (Weber 1997), expected utility method (Wiltshaw), and the normative valuation model (Richards 1997b), etc. have been introduced to value contaminated land.

Howerver the lack of accessible data (Patchin 1988, Spencer 1993, Syms 1996b) makes it difficult to use the conventional valuation methods to value contaminated land. Even if market evidence is available, it does not help as "each environmental problem is as unique as fingerprint" (Wilson 1992). Regarding the alternative methods, they are rarely used by practitioners because they are either too academic or impractical.

It is a fact that the value of a contaminated property may be affected by stigma. If the property is not affected by stigma, the valuation is more straightforward as no value adjustment is required in this regard. Where there is evidence to show the existence of stigma, valuers need to take the stigma impact into account. Unfortunately, it is very difficult to quantify stigma. Despite the availability of different valuation methods, none of the methods are specifically for the assessment of stigma. This Chapter examines the current methods to assess stigma and comment on their robustness.

6.2 The nature of stigma

Stigma was briefly touched upon in Chapter 1 and Chapter 5. In short, it is a further discount to the land value in addition to the remediation cost (Wiltshaw 1998). The impact of stigma on property value was first reported in the United States by Patchin (1988).

A number of property researchers, such as Patchin (1988, 1991 & 1994), Mundy (1992a, 1992b, & 1992c), Wilson (1994), Roddewig (1996), Sanders (1996), Syms (1996a, 1997a, & 1997b), Richards (1997b) Neustein and Bell (1998), and Bond (2000), etc. have studied and confirmed the impact of stigma on the value of contaminated property. Stigma may have an impact on contaminated land value before, during or after the remediation process (Roddewig 1996). Apart from the contaminated property, stigma may also affect the adjoining land even though it is free from any contamination (Dybvig 1992).

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[1] This chapter is based on my publications as follows:
Chan N. 2000, *Assessment of Contaminated Land Stigma Impact*, paper presented at the 5th Asian Real Estate Society Conference, Beijing, China, 26 – 30 January.
Chan N. 2000, How Australian Appraisers Assess Contaminated Land, *The Appraisal Journal*, LXVIII(4), pp. 432 –440.

Today, the awareness of environmental problems is increasing. Very often the public perceives that many risks around them are getting more severe even though there is no scientific evidence to support the suspicion. To a certain extent, the public's perceptions are simply at variance with the real risks (Freudenburg 1988). In relation to contaminated land, stigma arises from the environment risks perceived by the public or the market (Syms 1997b). Although there may not be sufficient scientific evidence to show that a contaminated property causes any real environmental risks, the perception of potential problems nevertheless causes concerns and anxieties among potential purchasers, occupiers, developers, and financiers, etc. Apart from environmental risks, they also worry about the likely future financial and legal liabilities. It follows that if there is a choice, they will prefer a clean property.

Even after the land has been cleaned up to the highest standard, there is inevitably suspicion among potential purchasers/users that the harmful substances have not been reduced to a safe level. There is concern that, although the hazard may have reduced to acceptable level today, future environmental standards may require further remediation of the site. After all, there is no guarantee that a certain quantity of contaminants will not remain on the land after the remediation. There is fear that there will be public liability and health risks in the future. People do not completely believe the opinion of scientists that contamination of acceptable level is harmless to health (Patchin 1991). From a survey of perception of risks of contaminated land in 1996, Syms (1997a p.36) found that "valuers' perception of risk relating to the hazards associated with contaminated land was considerably greater than the non-valuer group". He explained that the cautious attitude of valuers was due to the absence of appropriate guidance from the government and professional organizations.

The Australian Property Institute (API) has drawn its members' attention to this issue and advised that "where there is a market perception that a property is or has been contaminated, despite the availability of information that clean-up has taken place, the market will often pay less than normal unaffected values. This situation is similar to obsolescence and represents a lingering detriment to a property." (API 1999 p.191) To compensate for the concern, the price or rent of the land is discounted. Richards (1997b) treats stigma from the point of view of cost and considers that it is an indirect cost that affects the value of contaminated land. Mundy (1992a) points out that the greater the perceived residual risk, the greater will be the discount. For this reason, the price or rental of not only the contaminated land but also the land which is close to a contaminated property may also be depreciated.

Stigma that exists before remediation is known as 'pre-remediation' stigma, whereas stigma that exists after remediation is known as 'post-remediation' stigma (Wiltshaw 1998). Before remediation, the land value loss due to stigma is at its highest level because no action has been taken to remove the health risk and associated legal liabilities. After remediation, there is still fear that there may be residual contamination and hence future legal liabilities. Accordingly, there is still a discount on the land value. A detailed analysis of how stigma affects land value is given on page 6 – 4. In comparison, the stigma that affects a clean property due to its proximity to a contaminated property is known as 'proximity' stigma (Collangel & Miller 1995).

Proximity stigma is analogous to the value loss due to fear of potential health risks caused by high voltage overhead transmission lines to nearby properties (Kinnard, Mitchell & Webb 1989, Hamilton & Schwann 1995, Kinnard & Dickey 2000). Researchers have confirmed the existence of proximity stigma on properties close to landfills (Kohlhase 1991, Nelson et al 1992 and Reichert 1997), nuclear facilities (Miller 1992) and underground storage tanks (Simons & William & Sememtelli 1997). In addition, stigma may arise due to real or perceived contamination on the site. Regarding the question of whether stigma is rational or irrational, Wilson (1992) comments that it is inappropriate to making the assumption because value is not dependent on whether the market is rational or irrational.

The concern and anxiety of potential buyers and occupiers have led to a market resistance against contaminated or previously contaminated properties (Neustein and Bell). The market resistance peaks when people first know about the land contamination and little information about the associated environmental risks is available. Also the incident may be under substantial media exposure such that people may have an unwarranted bad impression of the property. As time lapses and that more information is available about the extent of the environmental risks and the remediation actions taken or to be taken, the concerns and anxieties will ease and the market resistance will diminish (Chalmers & Jackson 1996). On the other hand, the marketability of the property will be increasing. A classic example given in American texts is that, in the 1970s, there had been great concern about the health risks caused by asbestos. Properties with components made of asbestos were difficult to sell or let. Today, when people know more about asbestos and its associated health risks, the concern has been considerably reduced. What was difficult to sell or let before has a much higher marketability today. The change of market resistance and marketability of a contaminated property can be seen in Figure 6 – 1.

It is evident that market resistance to and marketability of a contaminated property change with the property's position along the time-line. When assessing stigma impact, a valuer is therefore required to identify at which point on the time-line that the valuation is being carried out. At the same time, the valuer has also to consider other relevant criteria to assess the magnitude of the stigma. In the USA, Patchin (1991) has identified 6 criteria to assess stigma:

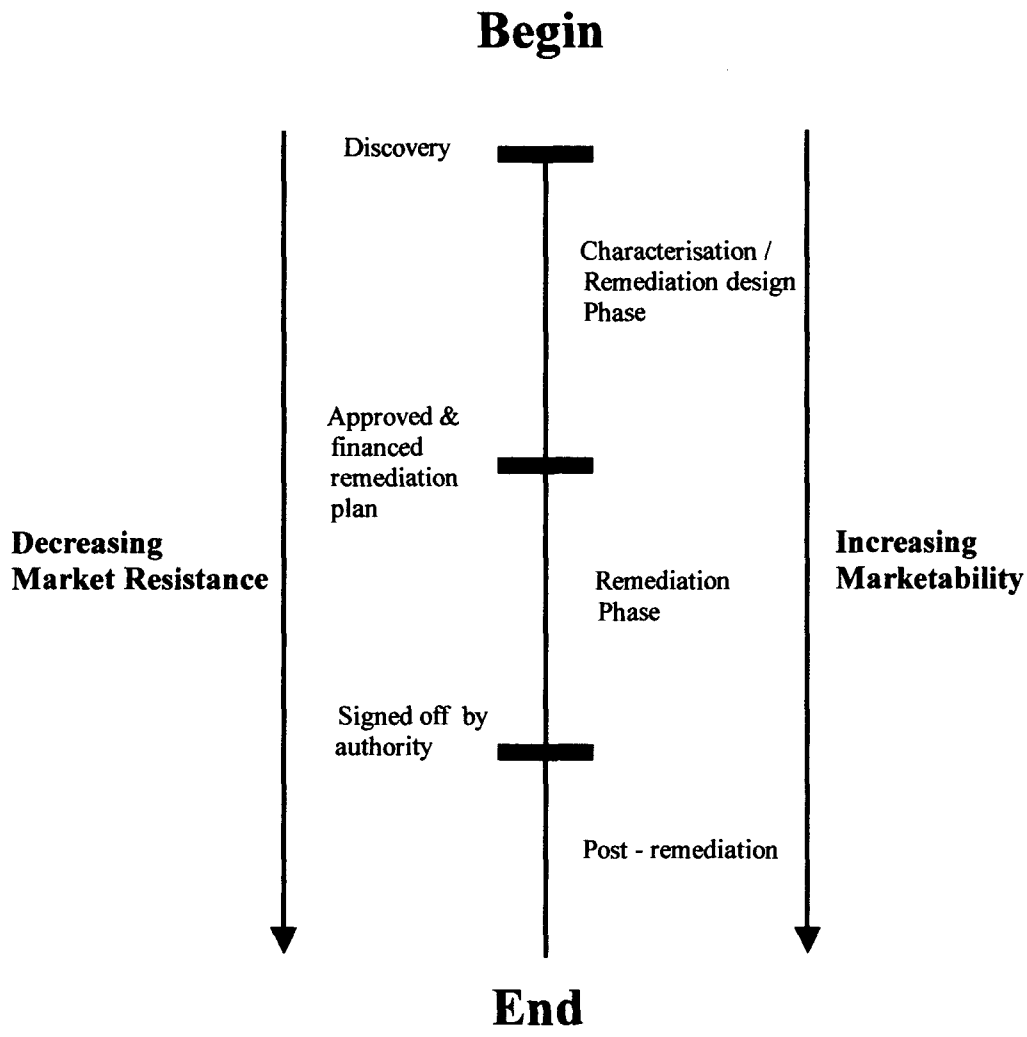
1. Fear of hidden clean up costs – fear of insufficient clean up today and future clean up is required.
2. The trouble factor – although the cost of clean up has been allowed for, buyers still feel it necessary to have compensation for the trouble of making the necessary improvement to the property.
3. Fear of public liability – there may be future legal liability even though the property has been cleaned up to the current standards.
4. Lack of mortgageability – inability to get financing for sale or future development of the property.
5. Property type – different market reaction according to if the property is residential or commercial
6. How clean is clean – the remediation standard required and achieved in the clean up

Further to Patchin's work, Mundy (1992a) also puts forward another 7 criteria to determine the degree of stigma:

1. Disruption – whether the day-to-day business on the contaminated premises is affected.
2. Concealability – can the pollution be seen, smelled or felt?
3. Aesthetic effect – does the contamination visually alter the environment?
4. Responsibility – who is the polluter?
5. Prognosis – the severity and persistence of the contamination.
6. Degree of peril – impact on the entire environment and human health.
7. Level of fear – the degree of people's fearful feeling towards the contamination.

These criteria are accepted and referred to by researchers such as Guntermann (1995), Dotzour (1997), and Syms (1997b) in their study of contaminated land issues.

Figure 6-1 Time-line of market resistance and marketability of contaminated land



Source: Based on Chalmers & Jackson (1996 p.48)

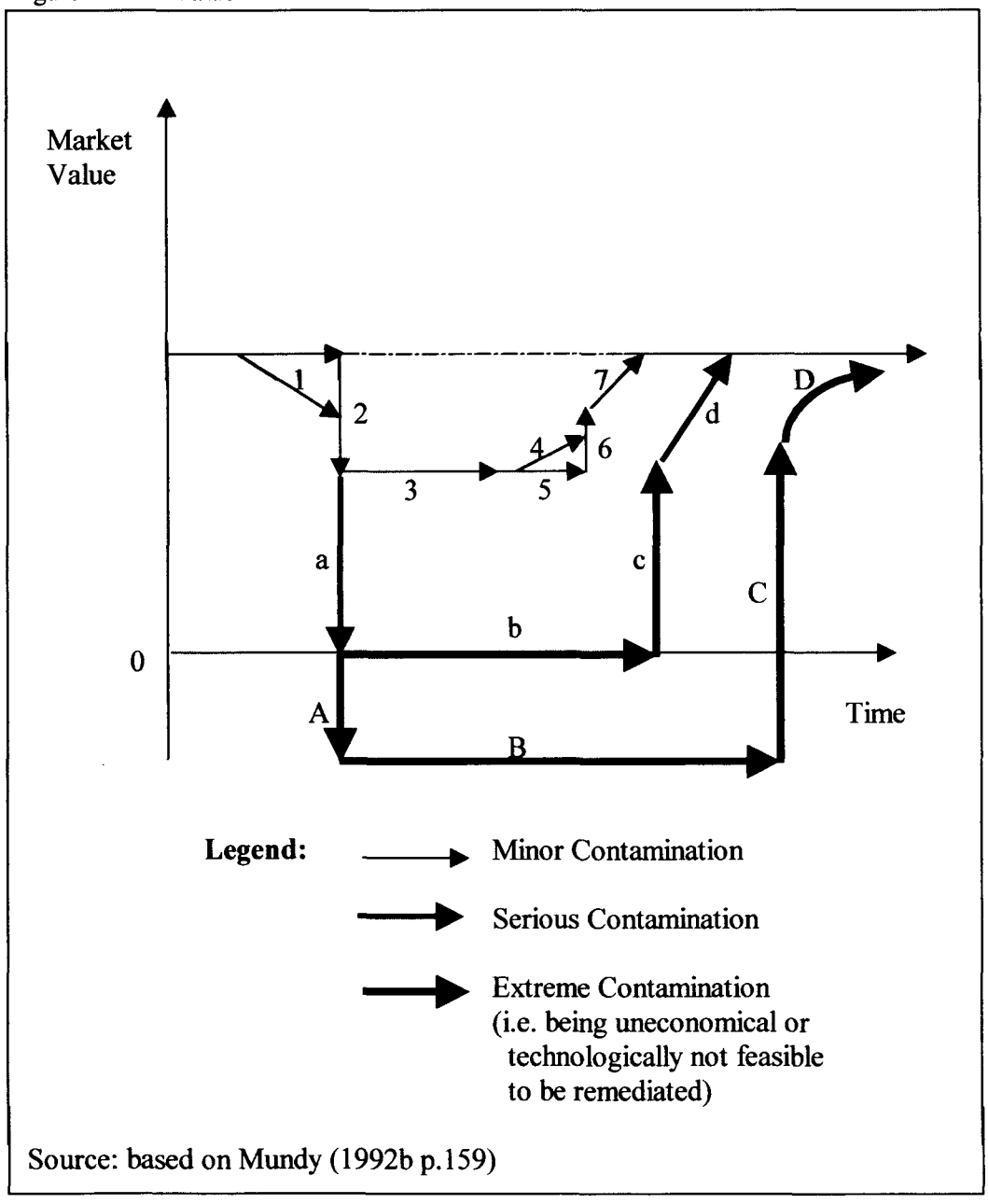
As pointed out above, stigma can be classified as pre-remediation, post-remediation. Where it affects a clean property due to proximity, it is called 'proximity stigma'. The impact of stigma on property value in the 'pre', 'during', and 'post' remediation stages is shown graphically in Figure 6 –2 on the next page.

Mundy (1992b) suggested that the impact of land contamination on land value is as shown by arrows 1 to 7 in the above figure. The land value is at full market value before the problem occurs or before the problem is made known to the public. When the public knows about the contamination, the value falls along arrow 2. Arrow 1 shows the possible decrease in value if the hazard is observable. Arrow 3 shows the level of value while the hazard remains. When the public knows more about the hazard and perceive that the problems are not so serious, the marketability of the property improves a bit and the value will increase as shown by arrow 4. If the health risk is unacceptable, the value will remain level along arrow 5. When the land has been cleaned up, the value will improve as shown by arrow 6. Arrow 7 represents the loss of

value due to stigma. It takes time for the impact of stigma to fade out. Only by then will the property regains full market value.

Mundy's analysis gives a general picture about the change of land value due to contamination. However it does not reflect the impact due to different levels of contamination. To better understand the impact of land contamination on land value, it is necessary to extend the analysis to cover at least two more situations, a serious contamination scenario and an extreme scenario. The extension is based on Mundy's work. For serious contamination, once the land is known to be contaminated, the market value may plummet along arrow (a) to zero as the land is no longer marketable although it may still have value in use. The value will remain level along arrow (b) until the land is cleaned up. After the remediation, the value will rise along arrow (c). Again there is value loss represented by arrow (d) due to stigma. Since the land contamination was serious, factors such as the bad image of the previous contaminated site and the disbelief that the land has been adequately remediated make it take longer for the impact of stigma to fade out.

Figure 6 – 2 Value Loss of Contaminated Land



Source: based on Mundy (1992b p.159)

In the extreme case, it will be uneconomical or technologically not feasible to remediate the site. The site will not only be unmarketable but also lose any use value because occupiers have to evacuate from the site. In addition, the owner may incur expenses to seal off the area. The overall value of the land is thus negative as shown by arrow A. The value will remain at this level along arrow B until such time that it is economical or technologically feasible to remediate the site. After remediation, the value will rise along arrow C. Since the land was previously extremely toxic, people are still worried about possible residual health risk and future legal liabilities. Exactly how long it will take for the impact of stigma to fade out depends on how the public perceives the residual health risk on the land. The site value may take an inestimable long time to return to its original level as indicated by arrow D. Mundy (1992b) points out that the time taken for the contaminated land to recover full market value is a function of a number of factors such as:

- the severity of the problem
- the type and amount of contamination
- time to cure and how the cure is accomplished
- media exposure
- real and perceived health risk

In the an extreme case, the time required for the impact of stigma to fade out will definitely be longer, probably along the exponential curve D. In fact, there may never be a remediation. For example, the Love Canal Estate referred to earlier had subsequently been fenced off as it is economically unviable to remediate the site (Bell 1999).

Stigma has different definitions in different countries. For example, in Canada, it is defined as "a market imposed penalty that can affect a property that is known or suspected to be contaminated, property that was once contaminated but is now considered clean, or a never contaminated property located in proximity to a contaminated property." (Dybvig 1992 p.47). In Australia, the API Guidance Notes 15 defines it as "an intangible factor that may not be measurable in terms of cost to cure but may have real impact on market value. It arises from the effect of present or past contamination upon the market's perception of the property and represents a discount, beyond the direct and indirect costs likely to be incurred, required to compensate for the risks associated with contaminated or previously contaminated property" (API 1999 p.190). For the purpose of this thesis, the Australian definition of stigma is adopted and the study is focused on post-remediation stigma.

The biggest problem with valuation of contaminated land is the presence of stigma. Stigma is difficult to assess because it is due to the perception of future health risks and liabilities rather than scientific facts or market evidence. Scientific facts can only show the level of contamination and the toxicity of the contaminants. They do not provide a guide to land value. Since contaminated properties are not traded regularly, there is a lack of market evidence. Even if market evidence is available, it cannot be relied on to assess stigma because of the uniqueness of individual contaminated land. As can be seen in Chapter 5, this is one of the reasons that some valuers avoid touching this issue by using the unimpaired (unaffected) value approach to value contaminated land.

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6.3 Does Stigma exist in Australia?

The existence of stigma has been reported in numerous property researches overseas (such as Patchin 1988, 1991 & 1994, Mundy 1992a, 1992b, & 1992c, Wilson 1994, Roddewig 1996, Sanders 1996, Syms 1996a, 1997a, & 1997b, and Neustein and Bell 1998). In Australia, there is also evidence of its existence. In my 1998 survey (see Chapter 5 for details), the majority of respondents with experience in valuing contaminated land confirm the existence of stigma and that they have allowed for stigma impact in their valuation. The presence of stigma depends on a number of factors. One of them is the market condition as highlighted in the following case study:

Case study – Garden Square, Upper Mount Gravatt, Queensland

The property is a landscaped office park about 12km south east of the Brisbane CBD. It has 4 office blocks with a total lettable area of 12,782m^2. The major tenants included Coles Myer, the Queensland State Government and the Commonwealth Government. The property was built in 1984. As at December 1997, the property was 98% let. The owner entered into an agreement with a property fund (the purchaser) for the sale of the property at $20.6 million. In the due diligence process carried out by the purchaser, some contamination was discovered on the site. Further investigation showed that the contaminant was old, weathered fuel which leaked from the adjoining Shell petrol filling station. The contamination was present to both the soil and ground water. The analytical results showed that a very thin plume (30m across) had occurred reaching approximately 70m into the subject property. The major health risk problem would be the result of hydrocarbon vapours entering the basement or utilities of the property.

Garden Square behind Shell petrol

Shell did not deny responsibility and in fact agreed to bear the clean up costs. The purchaser still felt uncomfortable and requested adjustment to the sale price to reflect the stigma factor. Eventually four independent valuers, two from each side, were appointed to assess the stigma impact. The two valuers for the vendor did not find any value loss due to stigma. One of the purchaser's valuers had very different findings. One found no stigma value loss but the other one found that there was a stigma value loss of $800,000. Eventually, the vendor and the purchaser settled on a stigma value loss of $100,000 and concluded the deal accordingly (Clarke, 1998). The case clearly demonstrates that the market condition is a major criterion for the determination of stigma. If it is a buyer's market, stigma may be used as a bargaining chip to negotiate for the final price.

The latest research on stigma in Australia has been carried out by Bond (2000). She carried out a study of 409 residential vacant land sales in Perth between 1992 and 1998. The land concerned was formerly filled with wastes that contain nitrate, arsenic and cyanide. After remediation, the land was subdivided into residential lots. She found that "a site with a history of contamination has a negative impact on value. This 'stigma' effect results in an approximately 35% decrease in sales price of post-remediated residential sites" (Bond 2000, p. 18).

Despite the stigma incidents referred to above, it should be noted that not all contaminated land has stigma. Important factors such as the type of contaminants, the degree of contamination, the remediation method, the clean up standards achieved, time lapse between discovery and valuation, who was the polluter/owner, and the market condition, etc. should be considered. In Sydney, the Pulpit Point residential development at Hunters Hill was built in 1992 on a previous oil depot site.


Pulpit Point development

The 12-ha site has good water front view and is facing the Harbour Bridge. The oil company spent approximately A$14 million to clean up the site and subsequently sold it for an up-market residential development (Spencer 1993). Owing to factors such as the site had been cleaned up by the oil company, and the superior location of the site, etc., the finished houses were sold at premium prices without any stigma impact even in a generally stagnant market. This case demonstrates that who cleaned up the site and the physical site characteristics are important criteria in the determination of stigma impact. In addition, the 'deep pocket' principle may also have an important role to play in this case.

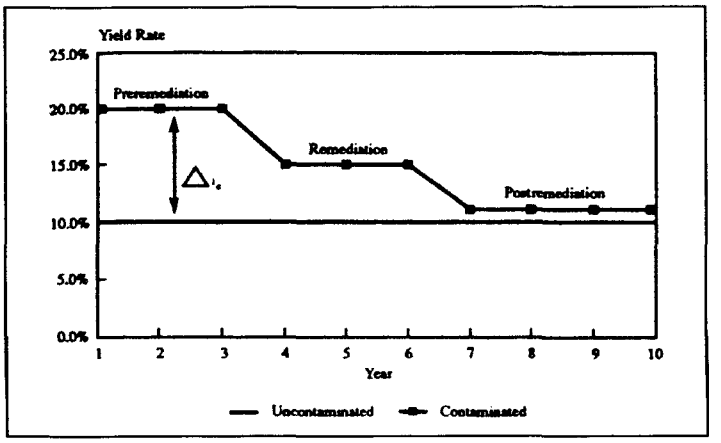

Pulpit Point development

6.4 How to quantify stigma? – The researchers' approaches

6.4.1 Where market data is available

The impaired value approach outlined earlier is a logical model for valuing contaminated land. However, it requires valuers to explicitly consider the stigma impact. It is this requirement that causes problem. How should stigma be quantified? Mundy (1992a) suggests that in a perfect world where there is a good quality set of market data, stigma can be determined using a direct approach having regard to rent, occupancy, expenses and capitalisation rate. Chalmers and Roehr (1993) support this idea and demonstrate the valuation of a contaminated property with the capitalisation method. They define stigma as "the reduction in value caused by contamination resulting from the increased risk associated with the contaminated property" (Chalmers & Roehr 1993 p. 33) and suggest to use a yield premium, Δi_c, to compensate for the risk of the contamination. Δi_c is equal to the difference between the capitalisation rate of an uncontaminated property and the appropriate risk adjusted capitalisation rate of a contaminated property. Chalmers and Roehr point out that there will be stigma effect as long as Δi_c is positive. They find that the yield premium will change with the lapse of time and have a pattern as shown in Figure 6 – 4.

Figure 6 – 4 Variation of yield premium



Source: Chalmers & Roehr 1993 p.35

Patchin (1994) also shows that stigma may be assessed with the direct comparison method. He suggests that the unimpaired and impaired values of the property are to be assessed using the direct comparison method. The indicated stigma is estimated by subtracting the impaired value from the unimpaired value. He also suggests estimating the indicated stigma by subtracting the actual selling price from the unimpaired value. A similar yet more elaborate approach is also put forward by Syms (1996a & 1997b). Apart from having reference to the nature and extent of contamination of comparable properties, it also takes into consideration the present value of remediation costs. This approach again has been borrowed and put into the Professional Practice 2000 by the API. An example of this method is reproduced in Figure 6 – 5.

These two approaches, however, have problems. Firstly, as mentioned before, it is difficult to get the unimpaired value by direct comparison because of the uniqueness of individual contaminated property. Two properties may be physically similar in all aspects but it is very rare that they are contaminated by the same type of contaminants and subject to the same degree of contamination. Secondly, it can be seen from Equations 5 – 1 to 5 – 4 in Chapter 5 that the difference between the unimpaired and impaired values is more than just the value loss due to stigma. Even if the expected repair cost (remediation cost) is added to the sale price (the impaired value), Sanders (1996 p.61) points out that it will not necessarily "give a good read on residual stigma".

Recently, Roddewig (2000) has suggested the use of an environmental risk scoring system to assess stigma. It is based on analysing case studies (sales of comparable contaminated properties) and assigning a score to source/cause of risk/stigma of the comparable properties and the subject property respectively. He suggests to assign a score of 0 – 3 for low level of risk, 4 – 6 for medium level of risk and 7 – 9 for high level of risk. By comparing the total score of the subject property to those of the case studies, the valuer may determine the stigma adjustment percentage for the subject property. He claims that this method may give more precision in assessing a stigma adjustment factor. This method relies on the availability of data from comparable contaminated properties. Unfortunately, it is very rare to get true comparables because of the uniqueness of individual contaminated properties. Accordingly, its application is limited.

Figure 6 – 5 Syms's enhanced stigma assessment method

Unimpaired value of land			£1 500 000
Present value of remediation costs			£ 108 290
Impaired value 1 – not allowing for stigma			£1 391 710
Comparable case studies			
Case Study Number	Indicated percentage of impaired value 1 lost to Stigma	Comparison to the property to be Valued	
1	25.9%	Treatment completed, stigma caused by fear of additional contamination, less severe than subject property.	
2	29.2%	No treatment proposed at present, continued industrial use, similar risk level to subject property.	
3	20.9%	Site not contaminated but is situated adjacent to a contaminated site.	
4	32.7%	Similar type of contamination to subject property but slightly more severe.	
5	45.4%	Heavily contaminated site, derelict land, more severe than the subject property.	
Range of stigma effects indicated by comparables 20.9% to 45.4%			
Comparables closest to subject property; numbers 2 and 4, 29.2% to 32.7%			
Therefore percentage stigma applicable to the subject property is 31%			
Amount of stigma @ 31% of impaired value 1			£ 431 430
Impaired value 2			£ 960 280
(taking account of treatment and associated costs and stigma)			
Add value of buildings			£1 000 000
Total value of asset		say	£1 960 000
Percentage reduction in value attributable to contamination			21.60%

Source: Syms 1997b, p.190

6.4.2 Where market data is unavailable

In the absence of the required set of market data, Mundy (1992a) suggests that stigma can be quantified by the application of contingent valuation method and trade-off (conjoint) analysis method. Mundy's suggestions have the support of researchers such as Chalmers & Roehr (1993), Greenberg & Hughes (1993). However, in a subsequent study (Mclean & Mundy 1998), despite finding that the contingent valuation method is the most defensible one, Mundy and his

co-author had reservations and recommended using this method as a supplement only. It can be seen that it is still premature to apply these methods for day-to-day operation of a valuer.

Syms (1997b) introduces a risk assessment model to assess stigma where market data is not available. The model applies the "professional perceptions which influence the judgements the valuer will have to make in order to arrive at his or her opinion of value" (Syms 1997b p.198). The model consists of 5 sets of data. It does not rely on market evidence but instead is based on 26 industrial activities identified by Syms and a stigma value reduction range of 21% - 69% taken from the work of Patchin (1994). It uses a survey of valuers and developers of contaminated properties to state the perceived impact on value before redevelopment; the perceived post-remediation impact on value; and the perceived impact on value after remediation/redevelopment. A sample of the model is reproduced at Figure 6 – 6 on the next page.

In the model, the first set of data is the observed stigma effect (21% - 69%) which sets a baseline for stigma impact on property value. The second set of data is the perception of relative levels of risk of 26 selected industrial activities and ranked according to the perceived stigma effect. These two sets of data provide a framework for assessing the target contaminated land. The remaining three data sets are based on risk related data for the present and expected condition of the subject contaminated land. To apply the model, a valuer needs to obtain 'value adjusters' from data set two to five. A mean value is calculated using the 'value adjuster' figures. The mean value obtained is the stigma factor required for the valuation.

This model is a significant improvement over the earlier methods, but could go further. The model is partly based on the stigma value reduction range from Patchin's work in the United States. The environmental risk perceptions in the United States may not match those in the United Kingdom. While Syms recognised the problem, he continued to use those figures in the model for reason that "the UK literature does not provide theoretical basis for determining a range of stigma effect" (Syms 1997b p. 199). Syms' problem in this regard can be solved by the carrying out of a survey as show in Section 7.5 of Chapter 7. Furthermore the list of 26 selected industrial activities could be expanded. In researching for the model, Syms identified and used only 26 selected industrial activities. Although the list is not meant to be exhaustive, there should be a proviso for the expansion of the list. In the real world, there are more than 26 industries and land uses that may have land contamination problems. For example in Australia, the Australian Property Institute Professional Practice 2000 lists 67 problematic industries and land uses. Yet this list is still not exhaustive. Bond (2000) also questions the validity of the suggestion to take the average of the 'value adjusters' in this regard. Since 'value adjusters' reflect different characteristics of the property, the different stage of the redevelopment process and the remediation method, the averaging approach appears to be inappropriate. Also if the 'value adjusters' vary widely, the accuracy of the mean value is questionable.

Figure 6 – 6 Syms's Risk Assessment Model

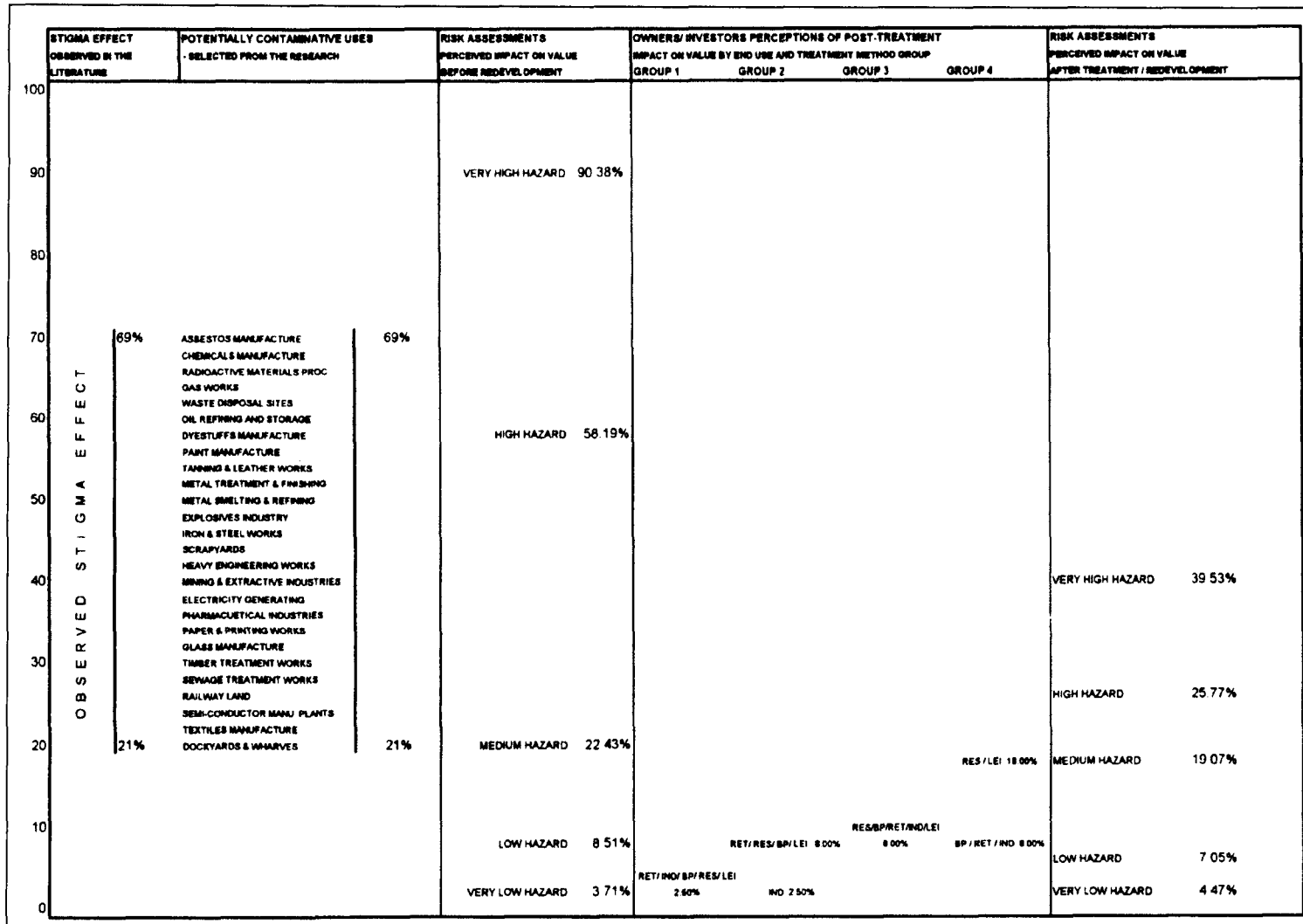


Fig. 9.4 The risk assessment model for the assessment of stigma. RET = retail park; RES = residential estate; BP = business park; IND = industrial estate; LEI = leisure use.

Source: Syms (1997b, p.200)

6.5 Methods used by practitioners

In my 1998 survey of Australian valuers, a large number of respondents claimed they had considered stigma when performing valuation of contaminated property. Table 6 – 1 shows the respondents' point of view stigma: 48% of the less experienced respondents claim that their clients have concern for this value impact and 56% of the experienced respondents share the same view. It appears that the stigma issue has already caused significant concern, if not an

alarm, among clients in the three States. This finding coincides with the finding of Schwaiger (1993) that 92% of the banks surveyed (18 Australian banks) are either concerned or very concerned about their liability under the current environmental legislation.

Table 6 – 1 Stigma factor issues

Questions	Less experienced group (%)	More experienced group (%)
Clients concern for stigma impact? (Yes)	48	56
Allowance for stigma factor in valuation? (Yes)	58	72

Source: Chan 2000b

A significant number of respondents (58% of the less experienced group and 72% of the more experienced group) have allowed for the stigma factor in their valuations. This implies that the majority of contaminated properties valued have stigma impact. Valuers realise the seriousness of the issues and have taken appropriate action when completing valuations.

For those respondents who claim to have made allowance for stigma impacts, various approaches have been applied (see Table 6 – 2 below). A number of respondents have chosen not to respond to question in Table 6 – 2. The figures obtained show that the majority of respondents use arbitrary discount rate and percentage adjustment methods to allow for stigma impacts. The lump sum adjustment method had the least support. In comparison to the survey results of Kinnard et al (1999), 66% of respondents in the United States, 80% in the United Kingdom and 83% in New Zealand use the increased discount rates method for adjustment.

Table 6 – 2 Stigma adjustment approaches:

Questions	Less experienced group (%)	More experienced group (%)	Out of total respondents with experience (%)
Abitray discount rate	16	22	19
Percentage adjustment	29	28	29
Lump sum adjustment	3	6	5
Other methods	3	13	8
Need to have a dedicated method to value contaminated land? (Yes)	10	13	11
Willingness to try new method to value contaminated land? (Yes)	35	69	52

Source: Chan 2000b

Regarding other methods of stigma impact adjustment, respondents claim to have used zero adjustment, arbitrary adjustment, higher profit and risk factor, using comparable evidence, and lower loan methods to value ratio. In comparison, respondents in the United States use reduced rental income, increased vacancy rate, increased capitalisation rate, increased debt interest rate, reduced loan to value ration, reduced amortisation period, increase equity yield rate and increased equity dividend rate for adjustment. The United Kingdom and New Zealand respondents only use reduced income as alternative method for adjustment (Kinnard et al 1999). In a separate survey in 1996, Richards (1997a) found that valuers in the United Kingdom mainly used upward adjustment for all-risk-yields or overall capitalisation rate, to account for

stigma. He also found that stigma could be allowed for "by making an end deduction or allowance" (1996 p. 15).

It is obvious that at present, there is a lack of a uniform method of allowing for stigma in Australia. While each method mentioned above has its own merit, the large number of methods makes it difficult for the valuers to choose the appropriate method to assess stigma. It is interesting to note that despite the lack of a uniform method of allowing for stigma, few respondents respond that there is a need for a specific valuation method. The more experienced group is more open, about 70% reported a willingness to try a new method.

When the respondents were asked about how they arrived at a figure for stigma adjustment with the methods mentioned, they declined to give the details but only said that they had taken all relevant factors into consideration. This implies that most of the figures were arrived at arbitrarily or through their 'gut-feeling'.

6.6 Conclusion

Stigma adjustment is a key element in contaminated land valuation with the impaired value approach. The surveys conducted in Australia and overseas show that valuers are using similar method such as the increased discount rate and reduced rental income to assess stigma. In Australia, valuers use more methods than their overseas counterparts. These methods include percentage adjustment, lump sum adjustment, arbitrary adjustment, higher profit and risk factor, comparable evidence and lower loan to value ratio. Despite the presence of a variety of methods, the stigma adjustment factor is generally obtained through a 'guesstimation' or 'gut-feeling' process. It is possible that well experienced valuers may estimate an accurate stigma adjustment factor in this manner. However, the skill is difficult to master and defend. This approach makes it very difficult for valuers who do not have the skill to assess stigma. Further, even the well-experienced valuers need a better method to verify their 'guesstimation'.

The methods suggested by researchers are not much better. Mundy's suggestions are fine in an ideal situation. In the real world, it is very difficult to apply the methods because of the lack of sufficient amount of market data. The contingent valuation method is not practical because it is a survey-based method. In real life, valuers are working under a very tight schedule. They may be required to submit a valuation report their client within a few days. There is no time to prepare and conduct the survey. The methods suggested by Patchin and Syms are also unsatisfactory for reasons given in the relevant sections. Accordingly, there needs to be a better method to assess stigma.

What should the stigma assessment model/method look like? The answer may be found from Trott's comment (1980 cited in Baum & Crosby 1989 p.128) that "[a] valuation technique, if it is to be accepted by the profession, must be easily understood and easy to use. Its theoretical soundness must be matched by a practical application". This view is also shared by Syms (1997b p.197) in his comment "[a]ny proposed model need to conform, so far as is possible, to the procedures recommended by the surveying profession, otherwise it is unlikely to be accepted by practitioners." With these comments in mind, a stigma assessment model is developed in Chapter 7.