

The Part IIA Regime

The Statutory Guidance, Defra Circular 01/2006 (Ref 2) describes, inter alia, the mechanisms by which the contaminated land regime is intended to work. This included reference to 'authoritative and scientifically based guidance values' of contaminants which would assist in the assessment/determination of contaminated land. A series of these Soil Guideline Values (SGVs) for a relatively limited number of determinands has been published by the Environment Agency.

It was estimated by the Environment Agency (eg see Reference 5) that some 5,000 to 20,000 sites in England and Wales could represent "problem sites" – in effect those which could be dealt with under Part 2A.

Formal Determination

Since the introduction of the contaminated land regime, and publication of the relevant guidance, a considerable number of sites have been assessed by local authorities. A proportion of these sites have subsequently been formally determined as "Contaminated Land" and/ or Special Sites (Table 2). The picture is not simply represented by the data however, as in some years (2004 / 2005) individual sites occupied by housing have been subject to multiple determinations (ie one determination per dwelling). Of note is the hiatus in determinations in 2006 which followed publication of advice (CLAN 02/05) by DEFRA in 2005 (Ref 7).

Table 2. History of determinations under Part IIA

Year	Number of Local Authority Determinations	Number of Special Sites
2000/2001	44	2
2001/2002	19	11
2002/2003	38	2
2003/2004	10	5
2004/2005	223	1
2005/2006	193	5
2006/2007 (to July)	0	0
2006/2007 (to October)	6	1
Total	533	27

Source www.defra.gov.uk/environment/land/contaminated/faq.htm - as at October 2006

"Voluntary action"

A major element of the Part IIA regime was always intended to be that of voluntary action. Such action anticipated either; remediation of contaminated land during redevelopment (regulated by the planning regime) or that responsible corporate bodies would wish to remediate land contaminated by their historical activities, not only to avoid formal determination by the local authority, but also as a matter of good corporate governance. As a part of this "snapshot" of the contaminated land community, information on the work of two such major landowners has been provided.

British Gas

British Gas (under various corporate titles) has been involved in an extensive programme of investigation, assessment and remediation of their contaminated sites. British Gas has stated that they have spent some £290m on the remediation of approximately 600ha of land (Ref 6). This equates to an expenditure of approximately £0.5m per ha.

Defence Estates

Defence Estates are engaged in a major programme of assessing the Ministry of Defence's land-holdings to enable both an understanding of the land quality of the estate, but also to enable divestiture of surplus land. Currently, Defence Estates own some 240,000 ha of land on some 4,000 individual sites. About 1,000 of these sites have been subject to formal assessment of land quality. To date only one MoD site has been formally determined as Contaminated Land. It is also of interest to note that the current MoD land holding is a relatively small fraction of what was once under military control/ use. Currently, MoD own about 1% of the UK land area. In the past this value has been as high as 24%, indicating there is a considerable potential for encountering land of previous military use across the UK.

Contaminated Land and the Planning System

It is generally accepted that most sites of land affected by contamination are subject to remediation upon redevelopment. Such remediation therefore takes place under the planning regime where particular guidance is provided by the former ODPM (Ref 8). This guidance makes it absolutely clear that it is the developer/ landowner's responsibility to identify if their land is affected by contamination (ie to carry out appropriate investigations and assessments) and to ensure that any necessary remediation is undertaken to deliver safe development. The guidance also provides a link between the planning system and the Part IIA regime by stating that any such remediation carried out under the planning regime should remove unacceptable levels of risk, make the site "suitable for use" and ensure that "as a minimum" subsequent to the development "the land should not be capable of being determined as Contaminated Land under Part IIA."

The National Housebuilders Council (NHBC) has provided an illustration of the current scale of residential development on brownfield sites. This data is summarised in Table 3 below. In 2005, just over 12,5000 sites were registered with the NHBC. These sites varied from small areas with less than 10 plots (about 15% of the total) to relatively large sites with over 100 plots (about 1% of the total). Development on plots identified as "contaminated" (meaning affected by contamination) formed about 54% of the total (number of plots). There was also a tendency for the development on contaminated land to take place on the larger sites (ie those with over 50 plots).

Table 3. Summary of some NHBC information

Number of plots on site	No. of contaminated plots	No. of uncontaminated plots
>100	58,000 [71%]	23,000 [29%]
50-100	28,000 [61%]	18,000 [39%]
10-50	27,000 [42%]	38,000 [58%]
<10	3,000 [16%]	17,000 [84%]
Total	117,000 [54%]	96,000 [46%]

Rate of assessment

The rate of local authorities assessment of contaminated sites, either as a result of their own activities in collecting information or as a result of assessing information from others (eg from voluntary action or through the planning system) was included as one of the Best Value Performance Indicators by ODPM (now DCLG) (data for each authority is at www.bvpi.gov.uk/pages/index.asp). However, the indicators are not considered sufficiently well defined by many Local Authority contaminated land officers and many consider

comparison meaningless because “it would be like comparing apples with pears”. Notwithstanding this caveat, there is some data showing progress by local authorities in assessing sites. The variability is illustrated by base data from four local authorities in one English region (Table 1).

Table 1. Local Authority site assessment

Task	Local Authority A No. of sites	Local Authority B No. of sites	Local Authority C No. of sites	Local Authority D No. of sites
Risk assessment – sufficient data	118	20	71	113
Risk assessment – insufficient data	39	16	4	0
Walk over survey carried out	223	2	2	96
Planning: sufficient information – Pre March 2005	16	0	9	11
Planning: sufficient information - post March 2005	50	7	8	19
Information still to be collected or assessed	277	296	548	503

SGVs and background values

Concerns have been raised since the publication of the first batch of Soil Guideline Values (SGVs) that the values for some of the determinands are close to, at, or even below concentrations prevalent in the general environment (ie “background” concentrations). Of course such background concentrations vary considerably across the country reflecting not only the particular chemistry of the natural geological strata, but also the presence of long term anthropogenic activity (eg air deposition of lead from industrial activity and petrol driven vehicles; deposition of certain hydrocarbons associated with ash/ clinker from coal fires etc)

A number of reports provide information on sources of data and background values for this type of contamination (see refs 9, 10, 11). The British Geological Survey have published information (Ref 12) indicating that for several common determinands, the upper end of the range of background concentrations exceeds the SGV. This data is summarised in Table 4 below¹.

¹ All soils – Those sampled by G-Base outside of urban areas – number approximately 25,000. Sampled depth 35-55 cm. Coverage 50,000 sq km, mainly of Central and Eastern England, and the Tamar Catchment

Urban – Those sampled in major urban areas by G-Base – number approximately 7,000. Sampled depth 35-55 cm. Coverage 1800 sq km, mainly of Cardiff, Swansea, Wolverhampton, Telford, Derby, Mansfield, York, Scunthorpe, Hull, Lincoln, Leicester, Corby, Northampton, Peterborough and Glasgow.

Total concentrations in mg/kg (XRF methodology QA against analysis of international standards (soil matrix))

Tables 4a and 4b. Range of some background concentrations in UK soils Data provided by the British Geological Survey from their baseline geochemical survey project (G-Base) and Sustainable Soils Programme (www.bgs.ac.uk)²

Determinand	Range of background concentrations (mg/kg) median to 95 th percentile (include both Rural and Urban Data)	Rural: mean concentrations	Soil Guideline Value – [residential use with plant uptake] mg/kg
Lead	31 - 633	55	450
Cadmium	<0.25 - 3.0	0.45	1-8 (pH dependent)
Chromium	81 – 156	84	130
Nickel	27 - 87	30	50
Arsenic	13 - 61	16	20

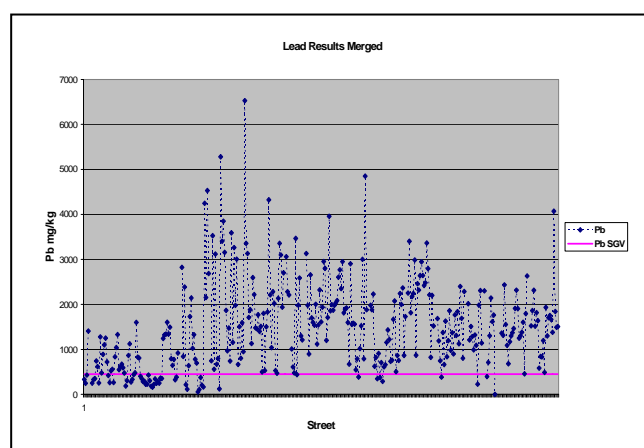
Substance	SGV	Approximate percentage of rural samples exceeding SGV	Approximate percentage of urban samples exceeding SGV
Lead	450	<1%	5%
Cadmium	1-8 pH dependent	<10%	2 to 25%
Chromium	130	<10%	10%
Nickel	50	10%	20%
Arsenic	20	20%	25%

Case Studies

Lead in topsoils

Data provided by one London local authority, graphically illustrates the impact of human industrial activity on general soil quality. The data is taken from samples of topsoils in area of public open space and gardens across the Borough. Data shows that some 80% of the soil samples have concentrations of lead above the SGV (450mg/kg) and 60% of those samples have concentration of lead in excess of double the SGV. Less than 1% of the samples have concentrations of lead an order of magnitude (ie greater than 10 times) the SGV.

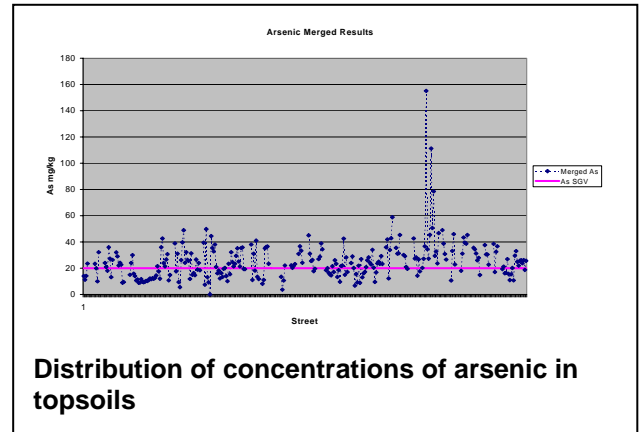
Distribution of concentrations of lead in topsoils



² Web pages:
<http://www.bgs.ac.uk/gbase/home.html>
<http://www.bgs.ac.uk/sustainablesoils/index.html>

Arsenic in topsoils

There is a broadly similar picture for arsenic where over 60% of the data points exceed the SGV (20mg/kg). However the number of points exceeding double the SGV (40mg/kg) falls to 8%.



Benzo(a)pyrene in topsoils

For many sites, both developed and those planned for development, the issue of background concentrations and the value of the SGV is most commonly encountered with one of the polycyclic aromatic hydrocarbons, benzo(a)pyrene [B(a)P]. The Tox report for B(a)P has been published for over four years but there is still no corresponding SGV report. Using the appropriate CLEA methodology with the data in the Tox report derives a Guideline Value for B(a)P of about 1.1mg/kg (for residential land use with plant up-take). Many topsoils in gardens across the UK (on both existing and new developments) contain B(a)P at or above this value. A “straw poll” of just a few development sites illustrates this situation where the US₉₅ value on all six sites exceeds the calculated Guideline Value of 1.1mg/kg.

Table 5 Concentrations of B(a)P in topsoils on residential development sites

Site (No of samples)	Range of concentrations B(a)P (mg/kg)	US ₉₅ value B(a)P (mg/kg)
Site A (42)	0.10 – 2.79	1.13
Site B (10)	0.01 – 3.40	3.40
Site C (18)	1.50 – 25.1	6.7
Site D (21)	<0.1 – 25.0	5.8
Site E (14)	<0.1 – 3.80	1.26
Site F (27)	0.18 – 18.2	3.84

A Guideline Value set at or about the background concentration presents significant difficulties to both the regulator and the regulated. The Regulator implementing Part IIA is faced with the potential “Determination” of, for example, thousands of Victorian properties where ash from coal fires has been used as a soil improver. The developer is required to “remediate” otherwise perfectly acceptable topsoils and also to find a source of topsoil material to import to site that does not contravene this test of acceptability.

Cost implications

It is difficult to estimate with any accuracy the cost to the UK economy of SGVs set at or close to background concentrations. But, the scale of the potential economic impact can be illustrated by a consideration of the forecasted scale of house building over the next ten years or so. In 2001, the ODPM estimated that 3.5million new homes would be needed over the 15 years to 2016 (equating to approximately 230,000 new homes per annum).

Assuming that (in line with the Government target) 60% of these new homes will be constructed on brownfield sites and that the remediation is by the construction of a simple capping scheme (at about £25/m²) and that the soft landscaping occupies about 33% of the development sites, it can be calculated that this type of remediation could cost approximately £450m per annum. Alternatively, using a “rule of thumb” remedial development cost of £1,000 per dwelling (a rough approach used by some developers/ consultants in pricing sites) an estimate of annual cost of remediation of about £135m per annum is derived.

Over the fifteen year plan period (2001- 2016) the above calculations indicate that this type of remediation on housing development sites is likely to fall somewhere within the range £2billion to £6.75billion. Of course not all of this remediation will relate to sites where the concentrations of arsenic, lead or B(a)P etc fall slightly above the SGV. Nevertheless, all of the indications are that currently, a substantial proportion of sites where remediation is taking place, do fall into this category.

The conclusion must be that continuation of the current practice will realise a significant cost to the UK economy and considerable waste of a precious finite resource, namely topsoil materials. It is argued that the presence of these determinands at concentrations above the SGVs do present a risk that which cannot be considered “tolerable” or “minimal”. But, when these SGVs are set so close to background concentrations in so many circumstances, it must be arguable whether the benefits achieved by “remediation” merit the costs incurred.

References

1. Guidance for the safe development of housing on land affected by contamination. Environment Agency & NHBC. 2000
2. Circular 01/2006. Environmental Protection Act 1990: Part 2A Contaminated Land. Defra 2006.
3. Industry Profiles. Department of the Environment (various). 1995 –1996.
4. Potential contaminants for the assessment of land. Environment Agency & DEFRA. R&D Publication CLR 8. 2002
5. Dealing with contaminated land in England. Environment Agency. 2002.
6. Indicators for Land Contamination. Environment Agency. 2005
7. Soil Guideline Values and the Determination of Land as Contaminated Land under Part IIA. CLAN 02/05. DEFRA 2005.
8. Planning Policy Statement 23: Planning and Pollution Control. ODPM. 2004.
9. Rawlins, B.G., R.M. Lark, K.E. O'Donnell, A.M. Tye, and T.R. Lister. 2005. The assessment of point and diffuse metal pollution from an urban geochemical survey of Sheffield, England. *Soil Use and Management* 21:353-362
10. Information on Land Quality in England: Sources of information (including background contaminants), R&D Technical Report P291, Environment Agency
11. Information on Land Quality in Wales : Sources of information (including background contaminants), R&D Technical Report P292, Environment Agency
12. Information on Land Quality in the UK. Summary R&D report PS 275. Environment Agency, 2000.