

SOUTH WEST HAZARDOUS WASTE TREATMENT AND CAPACITY REPORT 2005

**A TECHNICAL PAPER PREPARED BY THE SOUTH WEST RTAB TO
INFORM REGIONAL SPATIAL PLANNING POLICY FOR HAZARODUS
WASTE**

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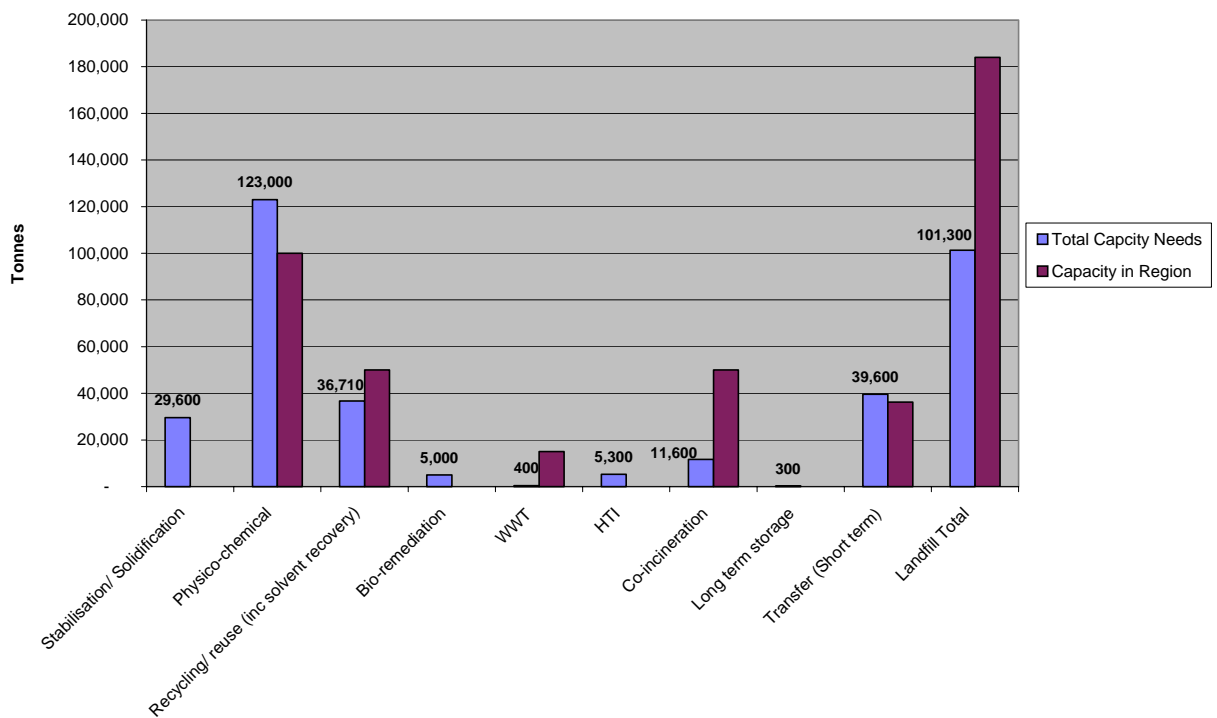
1.0 Background

- 1.1 The Environment Agency has previously provided analysis of special waste data for the intended purpose of developing robust regional waste management policy. Previous analysis completed for the Regional Waste Strategy was not considered comprehensive enough to inform any possible future allocation of special/hazardous waste treatment and disposal capacity for the south west region.
- 1.2 The assessment and modelling of special/hazardous waste has been an increasing priority both nationally and regionally due to the implementation of both the landfill and hazardous waste regulations in the UK. The immediate impact of both these directives has been two fold. It has reduced traditional landfill disposal routes both in capacity and site number terms, a situation potentially compounded by an increase in total hazardous waste arisings as a result of aligning the definition with existing EU Directives.
- 1.3 The Government set up the Hazardous Waste Forum to assess the impact of these regulatory changes and provide analysis, advice and contingency planning in the event of significant shortfalls in disposal or treatment capacity. The Forum and its members have commissioned several pieces of work in recent years in an attempt to identify the impact of legislative changes on the management of hazardous wastes.
- 1.4 The most recent work sought to model and identify the capacity required to meet the requirements for hazardous waste disposal under the new legislative arrangements. The Environment Agency presented a paper at the last SW RTAB suggesting that running this type of analysis at the regional level would provide the highest possible degree of certainty currently available in the assessment of hazardous waste management.
- 1.5 Following the presentation of initial modelling work the RTAB requested further analysis to assess the potential requirements for the disposal of hazardous thermal treatment residues and a further examination of sub-regional arisings of hazardous construction and demolition materials.
- 1.6 It has also been possible since the last RTAB meeting in February 2005 to include a review of historic data collected from the Environment Agency's Special Waste Tracking System (SWaT). And an assessment on the potential arisings and disposal requirements for the major component of hazardous Waste Electrical and Electronic Equipment (WEEE).

2.0 Regional Hazardous Waste Management Treatment and Disposal Capacity

- 2.1 The Environment Agency South West commissioned consultants to develop a regional model of hazardous waste management based on work completed for the National hazardous Waste Forum. Full details of the model and its underlying assumptions is available at Annex 2
- 2.2 Having reviewed the available data from our special waste records for the last six years it became apparent that due to the variability of the data that the last years data, 2003 would best represent the picture in the South West for modelling purposes. A comprehensive survey of existing capacity including co-incineration completed the initial data requirements.

Figure 1: Comparison of Estimated Requirement against the Estimated Available Capacity

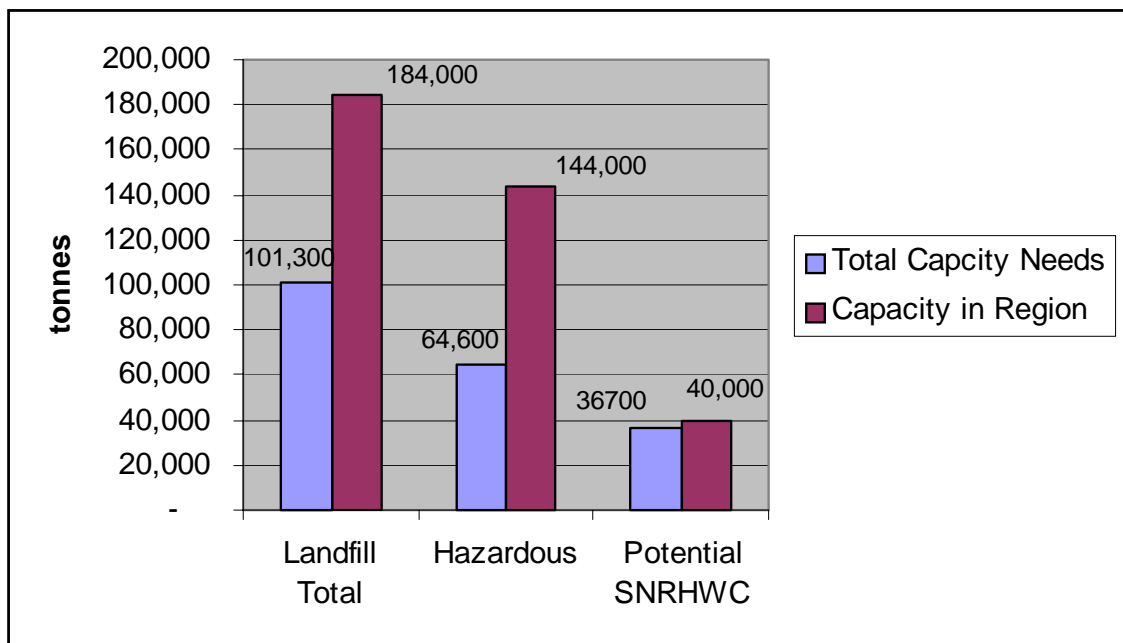


- 2.3 Figure 1 above would seem to indicate that the region is sufficiently well served across the broad range of hazardous waste treatment options. However it should be noted the regions physico-treatment capacity is dominated by one primary waste stream oil and oil/water mixtures. On average the region exports about half of all treated waste to other regions. This shouldn't be seen as unusual. Hazardous wastes by the variability of their properties require specialist technology to recover that is often only commercially viable at the national level (See also Annex 1)

3.0 Availability and utilisation of Landfill Capacity

- 3.1 The legislative changes since July 2004 have created two specific types of landfill for hazardous wastes. Capacity at dedicated hazardous waste landfills and capacity at biodegradable landfill for stable non-reactive hazardous wastes (SNRHW) in a separate cell. SNRHW are waste materials that will not measurably react with the environment when landfilled, for example, mineral and bonded asbestos bearing wastes. A more detailed breakdown of both capacity and potential disposal requirements for these two categories of landfill and wastes is presented in figure 2 below. Figure 2 is a sub-set of the modelled data presented in figure 1.

Figure 2: Comparison of total landfill capacity and annual capacity required 2005



- 3.2 Figure 2 above should be interpreted with some caution since it does not indicate regional capacity currently available or pending for asbestos only SNRHW cells at existing sites. An additional 48,000 tonnes of capacity has been permitted by the Environment Agency since July 2004 for the disposal of these wastes. This capacity should be considered well distributed across the region with sites in Devon, Somerset, Wiltshire and with an application pending in Cornwall. With regional disposal of asbestos wastes averaging around 5,000 t/annum (see also Table 1) over the last five years some capacity has yet to be commissioned though permitted. Anecdotal evidence from the waste industry suggests this is for commercial reasons, that is, the level of current arisings and pattern of disposal does not make commercial sense at present.
- 3.3 Focusing on requirements and capacity for other hazardous waste, excluding asbestos, the region is currently well served, in total annual capacity terms, for

general hazardous wastes. However capacity in the region is provided by only two sites both located in the east of the region, one site near Swindon and one site near Cheltenham. Although the hazardous wastes handled at the later have almost exclusively been APC/incineration residues imported into the site from other regions, including as far as London and the North West. As such the facility has not historically provided for the waste management of very much hazardous wastes arising in the South West region. The planning status of both these sites is temporary and renewal would be required to maintain annual capacity at the current permitted (planning) and authorised (pollution control permit) levels.

- 3.4 The total annual capacity figure of 184,000 tonnes (figure 2) is dominated by the authorised input at only one site, that in Cheltenham, with a permitted annual capacity in the region of 120,000 t/annum. This capacity while authorised and providing a total void in the region of 3.5 Mcum is limited by a current planning permission that expires in 2009. Similarly the planning status of the known site at Swindon is uncertain and may not be available in future years.

The pattern of hazardous waste disposal capacity

- 3.5 Prior to the ban on the co-disposal of hazardous waste with biodegradable wastes in July 2004 most counties or sub regions had capacity at existing landfills. The requirement to define sites as either hazardous or non-hazardous under the Landfill Directive has fundamentally changed this pattern of facilities. Hazardous waste disposal at landfill is now a highly specialised activity and operators have had to make commercial decisions on the status of their landfill operations. The fixed costs such as, site engineering and site management procedures, for hazardous waste landfills have increased significantly and now form the majority of disposal cost. As such other variable costs, particularly the transport element, are less significant in commercial decisions by waste producers.
- 3.6 The current pattern of hazardous landfill sites is a clear reflection of the considered opinion of the waste management industry on the commercial viability of the market for hazardous waste landfill. The contraction in the number of sites and their geographic distribution should be seen as *de facto* evidence that the market for hazardous waste landfill is now at least national and at best regional.
- 3.7 This new market for general hazardous waste disposal is seen in the South West by the waste industry's decision to develop sites at the eastern periphery and within the M5/M4 corridor and not in the peninsular region. A site located close to the primary road network and other regions can far more easily draw on a sub national or national market for hazardous waste disposal than one located in the regions peninsular.
- 3.8 The development pattern for asbestos disposal in cells for SNRHW could also be seen in the light of commercial decisions by the industry. Old co-disposal sites often only accepted asbestos wastes as the primary hazardous waste

stream and analysis in Chapter 4, Table 2, shows this waste stream to be relatively stable. In such a situation operators have been able to make reasoned judgements on the future market for asbestos disposal and the cost of developing separate cells at their landfills. The pattern of SNRHW cells would indicate a far more localised market that operates at the sub regional level.

4.0 Priority Waste Streams

Contaminated Land

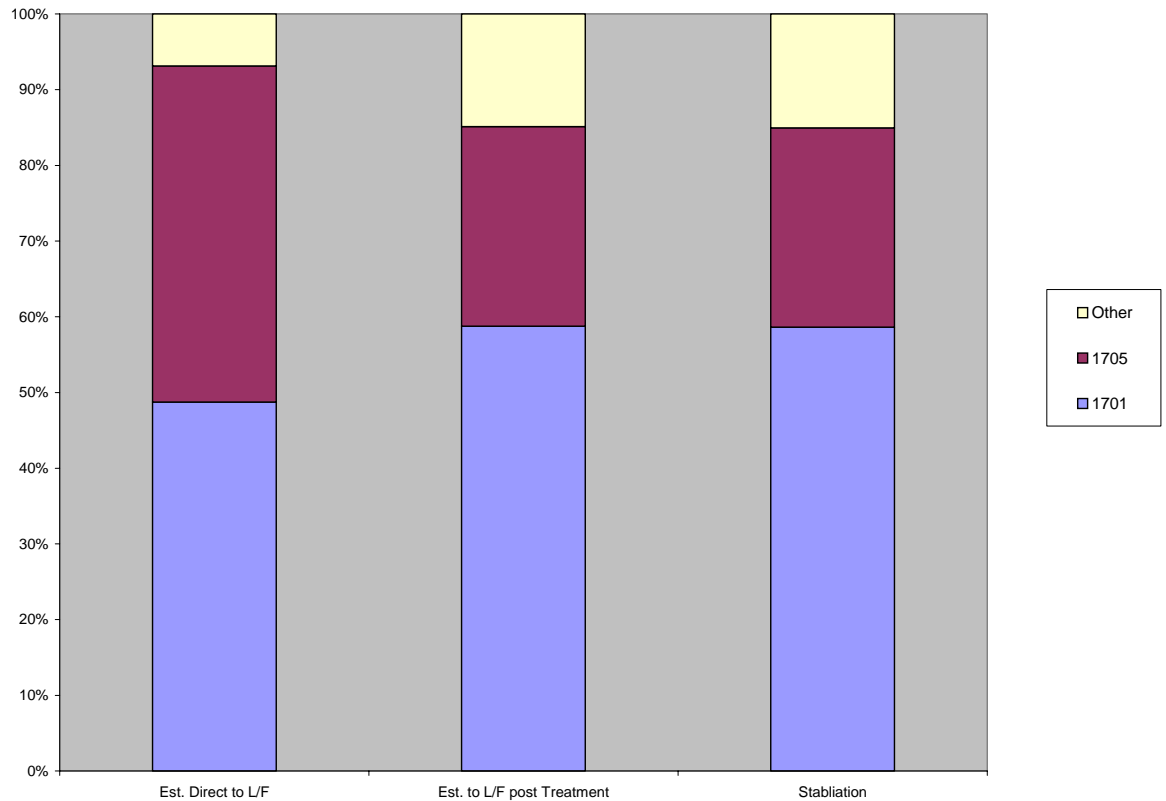
- 4.1 Previous reports to SW RTAB have highlighted several priority waste streams due to their overall contribution by weight. They are contaminated residue from construction projects, oil and oil/water mixes and waste from organic chemical processes. Contributing some 65% on average of the total landfill are contaminated soils (See also Annex 1).
- 4.2 Due to the nature of contaminated soils few other options except landfill are available even after treatment, if material is required to be moved from the initial site of production. These wastes are classified in the under **EWC¹** Chapter 17 as:
- 17 01 06* mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing dangerous substances
 - 17 05 03* soil and stones containing dangerous substances

An analysis of the contribution these waste streams make to the modelled requirements for landfill capacity and need for additional stabilisation and solidification is presented in Figure 3 (below). Wastes arising from the redevelopment of brownfield sites wholly dominate the predicted requirements. At least 80% of the required annual disposal capacity is needed for these wastes either directly deposited at landfills or disposed after treatment. Further the assumed primary treatment technology, stabilisation and solidification, is almost wholly required to treat these contaminated wastes. While other wastes traditionally landfilled may be directed away from landfill to other technical treatment options such as co-incineration hazardous soils have little other value and if still contaminated after any treatment process applied will need to be landfilled for permanent storage.

- 4.3 The landfill requirement of contaminated construction, demolition and excavation wastes is compounded by the modelled treatment route for about half of these wastes. The model considers the primary treatment route will be through stabilisation and solidification. This type of treatment requires the addition on other materials, such as cement, to bind and immobilise contaminants. The addition of other materials during stabilisation and solidification is estimated to double the final weight of waste requiring final disposal.

¹ The European Waste Catalogue (EWC) is a source oriented list of wastes under which all wastes are classified for the purposes of other legislation for example Hazardous Waste Regulations (2005) and the Duty of Care.

Figure 3: Percentage Contribution to modelled landfill requirements of contaminated re-development wastes



4.4 It is also possible to look at the pattern of waste consigned from the sub regions. Table 1 below presents data available from the Environment Agency for the years 1999 to 2003. The tonnage figures have been aggregated into general contaminated construction and demolition (C&D) wastes; EWC codes 17 01, 02,03, 04, 05 and 07. And hazardous insulation materials i.e. asbestos; EWC code 17 06.

4.5 The annual data at the sub-regional level shows a great deal of variability particularly for the general categories of contaminated C&D wastes. Calculating a statistical average for each sub-region is not considered a robust form of further analysis. Anecdotally, the data suggests that the largest arisings come from the city sub-regions (Devon with Exeter/Plymouth and West of England with Bristol/Bath) and lowest from rural and periphery counties. The data for asbestos wastes is less variable and an average may be a suitable measure. However the level of arising is generally low, fairly consistent and probably reflects the general level and capacity of the asbestos inspection and removal services in the South West. The size of sub regional arisings would again seem to follow the general pattern of urban development with the largest quantities in those sub-regions with major population centres, the West of England and Devon.

Table 1: Pattern of Hazardous C&D arisings in the South West by waste type and sub region 1999-2003

| Sub-Region | Waste Type | Year/ tonnes per annum | | | | |
|-----------------|------------|------------------------|--------------|--------------|--------------|--------------|
| | | 1999 | 2000 | 2001 | 2002 | 2003 |
| West of England | mixed C&D | 6204 | 8660 | 13541 | 13659 | 8758 |
| | Asbestos | 2425 | 1293 | 1688 | 1604 | 2836 |
| Cornwall | mixed C&D | 415 | 1311 | 1826 | 1743 | 2157 |
| | Asbestos | 255 | 170 | 186 | 185 | 102 |
| Devon | mixed C&D | 6531 | 6906 | 4563 | 12593 | 7043 |
| | Asbestos | 335 | 315 | 501 | 559 | 1127 |
| Dorset | mixed C&D | 3626 | 19389 | 4037 | 6440 | 3073 |
| | Asbestos | 388 | 254 | 391 | 322 | 439 |
| Gloucestershire | mixed C&D | 1168 | 12940 | 16343 | 4288 | 4672 |
| | Asbestos | 409 | 513 | 173 | 602 | 2002 |
| Somerset | mixed C&D | 2609 | 3083 | 2061 | 2538 | 7321 |
| | Asbestos | 82 | 293 | 208 | 363 | 1195 |
| Wiltshire | mixed C&D | 3152 | 6227 | 5388 | 12609 | 8005 |
| | Asbestos | 526 | 301 | 465 | 449 | 1082 |
| Totals | mixed C&D | 23706 | 58514 | 47760 | 53869 | 41029 |
| | Asbestos | 4421 | 3139 | 3610 | 4084 | 8785 |

Potential hazardous wastes from thermal treatment options

- 4.6 The Regional Waste Strategy: From Rubbish to Resourceⁱ published by the South West Regional Assembly sets out the broad strategy for waste management and disposal until 2020. The strategy seeks to increase recycling and recovery of waste through improved source segregation of waste for example by kerbside recycling for municipal wastes, and the recovery of any residual wastes through mechanical, biological and thermal recovery technologies. In theory up to half of residual municipal wastes could be treated by thermal methods either incineration or gasification/pyrolysis technologies by 2020.
- 4.7 Thermal based energy from waste plants whether conventional incineration or advanced pyrolysis type plants generate hazardous waste residues from the flue gas cleaning process. These wastes are known as Air Pollution Control (APC) residues and average about 3.5% by weight of waste through put for all thermal treatment technologies currently operating in the UK.
- 4.8 A model of potential APC arisings is set out at Annex 3. The modelling results from low and high thermal treatment strategies for residual wastes are combined with the modelled estimate of current arisings illustrated in figure 2 to give an indication of the cumulative hazardous landfill void required over a plan period to 2020.
- 4.9 The two extreme scenarios for potential APC generation are presented and combined with the modelled arisings of hazardous waste requiring landfill form the previous analysis in Chapters two and three previously. The low case

assumes only 25% of residual wastes will be thermally treated. This would represent about 250,000 tonnes of municipal wastes and around 500,000 tonnes of commercial wastes or a total annual capacity of 750,000 tonnes.

- 4.10 The South West currently has no thermal treatment capacity on this scale for either waste stream. Some speculation on the reasonableness of this low case scenario requires a review of local plans for waste. Since no authority has let a contract for waste disposal that uses thermal treatment the following is based purely on anecdotal evidence available from a review of recent plans and options being discussed by individual authorities. At least four authorities are actively considering thermal treatment of residual wastes by either conventional incineration or advanced thermal technologies. At an average small scale through put of 100,000 tonnes per annum this would indicate a capacity in the range of 400,000 tonnes per annum by 2020.
- 4.11 The development of thermal treatment capacity for commercial wastes is also highly speculative at present. What is known is that commercial waste management operates in a free market and the choice of waste management option is price sensitive. The government has stated that it will raise landfill tax in the first instance to £35 per tonne by 2010. Such increases in landfill tax will make a whole range of other waste management options commercially viable not least incineration. As such the development of 500,000 tonnes of capacity for commercial wastes either independent or in partnership with developments in the municipal sector would seem reasonable at the lower end of the scale.

Table 2: Estimated hazardous waste landfill requirement over a 15 year plan period

| Year | Estimated Hazardous waste requiring disposal (tonnes) | APC (MSW) | | APC (C&I) | | Cumulative requirements (tonnes) | |
|------|---|-----------|-------|-----------|-------|----------------------------------|---------|
| | | Low | High | Low | High | Low | High |
| 2005 | 65000 | | | | | | |
| 2006 | 65000 | | | | | 130000 | 130000 |
| 2007 | 65000 | | | | | 195000 | 195000 |
| 2008 | 65000 | | | | | 260000 | 260000 |
| 2009 | 65000 | | | | | 325000 | 325000 |
| 2010 | 65000 | 6439 | 19318 | 9188 | 27570 | 405627 | 436888 |
| 2011 | 65000 | 6439 | 19318 | 9188 | 27570 | 486254 | 548776 |
| 2012 | 65000 | 6439 | 19318 | 9188 | 27570 | 566882 | 660665 |
| 2013 | 65000 | 9389 | 28168 | 11460 | 34390 | 652731 | 788223 |
| 2014 | 65000 | 9389 | 28168 | 11460 | 34390 | 738581 | 915781 |
| 2015 | 65000 | 9389 | 28168 | 11460 | 34390 | 824430 | 1043339 |
| 2016 | 65000 | 9389 | 28168 | 11460 | 34390 | 910279 | 1170898 |
| 2017 | 65000 | 9389 | 28168 | 11460 | 34390 | 996129 | 1298456 |
| 2018 | 65000 | 9389 | 28168 | 11460 | 34390 | 1081978 | 1426014 |
| 2019 | 65000 | 9389 | 28168 | 11460 | 34390 | 1167828 | 1553572 |
| 2020 | 65000 | 8861 | 26584 | 17760 | 53290 | 1259449 | 1698446 |

- 4.12 Table 2 seeks to summarise the previous discussions to provide an indication of hazardous waste landfill capacity potentially required over the period to 2020. Assuming the general level of arisings modelled in previous sections of this report remains unchanged the region would require somewhere in the region of 1.25Mt and 1.7 Mt of capacity by 2020.

Newly Hazardous Wastes- Waste Electrical & Electronic Equipment (WEEE)

- 4.13 There remains considerable debate on the future impact of recent changes to the definition of hazardous waste and the impact of recycling and recovery targets for waste electronic equipment (WEEE). Some electrical devices, in particular cathode ray tubes (CRT) are now defined as hazardous wastes by virtue of the EWC discussed previously. Many other electronic devices may be considered hazardous and require appropriately permitted facilities to store, transfer and treat prior to any disposal.
- 4.14 The government is currently consulting on permitting arrangements to meet the objectives of the WEEE Directive. The proposals envisage the use of a simple permitting regime strictly limiting capacity at any new sites Under this scenario the type of facilities generally required will be small scale and perhaps not out of place in a general industrial environment.
- 4.15 Work by ICER has indicated that there is currently no viable recovery method for waste CRTs. An estimate of the potential hazardous waste disposal requirements for CRTs estimates an annual arising of around 100,000 nationally. About 70% of this total is generated by household televisions. The South West represents around 10% of the national population. On a per capita basis that would suggest a further 10,000 tonnes of hazardous waste CRTs will require disposal per annum.

5.0 Conclusions

- 5.1 Historic information (Annex 1) on hazardous waste management shows a gradual decline in the amount of waste managed. Data is only available for the five years 1999 to 2003 and a reasonable assumption would be that at least hazardous waste arisings are not growing but relatively stable at around 300,000 tonnes per annum.
- 5.2 No single sub region produces enough waste requiring landfill to merit the allocation of general hazardous waste disposal capacity. Existing hazardous waste landfills located on the regional boundary are utilised by wastes from other regions and as such represent a national and regional resource.
- 5.3 Changes in the market for general hazardous waste disposal since July 2004 mean that planning renewals at existing or even new sites for disposal are now most likely to come forward in boundary counties/sub-regions and in areas with good access to primary transport networks.
- 5.4 The analysis indicates that the region has sufficient treatment and transfer capacity for existing hazardous waste streams traditionally managed through this infrastructure regionally and nationally.
- 5.5 The continuing disposal of asbestos waste in the region should be considered secure in the medium term albeit with potential localised shortfalls in East Dorset and the peninsular including West Devon. The Environment Agency is currently unaware that these localised shortfalls are having any significant effect on local industry or on increased illegal activity i.e. flytipping.
- 5.6 The region has currently permitted hazardous void capacity for around 3.5 Mcum (5.4 Mt at averaged emplaced density) at annual permitted input rate of approximately 180,000 tonnes per annum for general hazardous wastes and some 40,000 tonnes per annum of asbestos and other stable non-reactive hazardous wastes.
- 5.7 The modelling and estimation work indicate that the region will require at least 1.0Mt of landfill void to meet its disposal requirements and possible 1.85Mt depending principally on the level of thermal treatment of residual wastes from domestic and commercial sources by 2020. The annual input rate would lie in the range 65,000 to 80,000 t/annum.
- 5.8 Ongoing capacity at sites permitted and authorised for hazardous waste disposal is limited by planning permissions which have or will expire by 2009.
- 5.9 Contaminated wastes from redevelopment sites should be considered the immediate priority. This single waste has and will continue to dominate the requirements for landfill capacity.
- 5.10 Permitting requirements for hazardous WEEE storage and treatment facilities will be available through exemption from the requirements of the Waste

Management Licensing Regulations. Exempt facilities will be limited to a storage capacity of 50 tonnes and a through put of two tonnes per day.

- 5.11 Potential requirements to dispose of CRTs arising principally from the regions households could amount to around 10,000 tonnes per annum

6.0 Recommendations for Regional Policy Responses

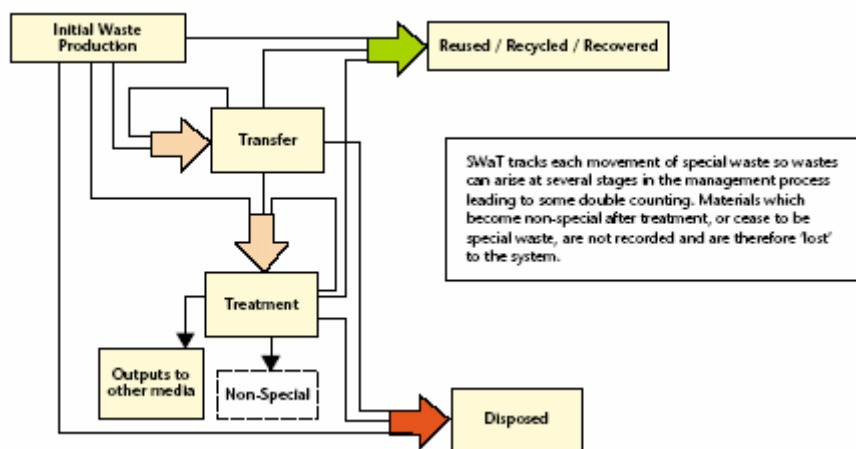
- 6.1 Government Planning guidance for waste published in PPS 10 set out the key planning objectives for waste. Any regional policy response should be formulated to achieve the aim of reducing waste where possible, finding opportunities to recycle and recover waste and address the need for disposal where it arises. The following series of policy responses to address these primary objectives are set out below.
- 6.2 The technical analysis in this report has identified that wastes from the construction industry, principally wastes from the redevelopment of contaminated sites will comprise the vast bulk of the required disposal capacity.
- 6.3 RSS policy should be targeted at reducing this waste stream by promoting the use of potential waste treatment options that can reduce the size and/or hazardous properties of this waste stream with a specific preference for on site or *in situ* treatment.
- 6.4 Analysis indicates that the region is relatively well provided for in terms of waste treatment technologies. Regional policy should seek to safeguard existing developments to ensure we maintain our capacity as part of the existing integrated national network.
- 6.5 Further requirements for waste transfer and treatment particularly for hazardous WEEE type wastes are inherently unpredictable and subject to market pressures. RSS policy should seek to provide a simple criteria based policy to address the potential need to develop an appropriate network of facilities to achieve the aims of the WEEE Directive. The policy should recognise the likely limited scope of such facilities and direct development to light industrial use classes.
- 6.6 Equally the development of cells for the deposit of SNRHW at existing or newly proposed sites for the deposit of non-hazardous waste should not be unduly restricted due to the sub-regional market for this specific type of waste and the relatively small scale nature of this activity.
- 6.7 Waste disposal to landfill will still be required and spatial planning policy should recognise that the market for hazardous waste landfill is of national significance. The region should seek to preserve its contribution to this national network of facilities and recognise that locations on our eastern boundary with access to the primary transport network are the best candidates for ongoing development.
- 6.8 Our annual contribution to national capacity should be in the range 65,000 to 80,000 t/annum in the first instance but subject to annual review as the market for hazardous waste disposal is likely to be contracting over time as price signals drive improved waste management.

ANNEX 1

A1.0 ANALYSIS OF HISTORIC HAZARDOUS WASTE MANAGEMENT

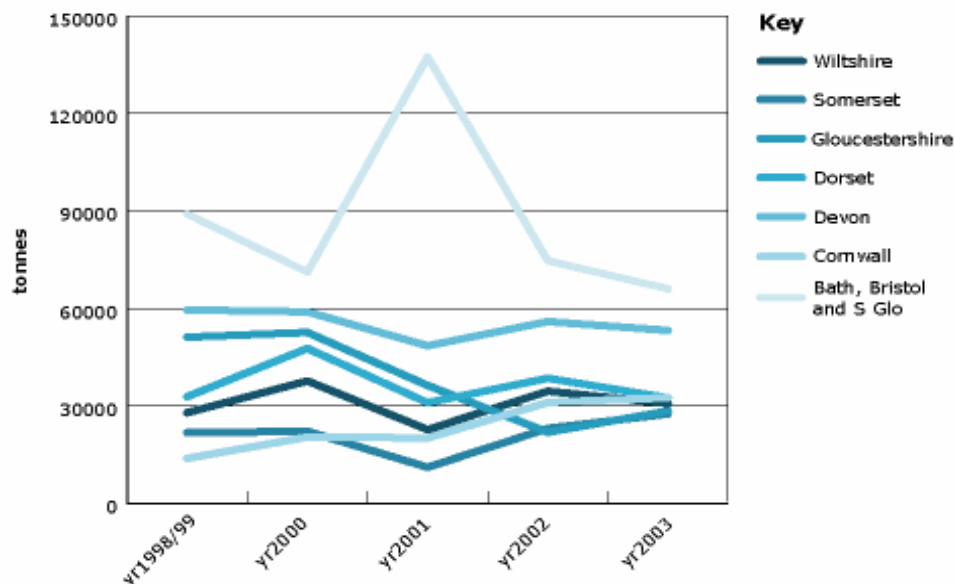
A1.1 The Environment Agency's system for tracking the consignment and fate of Special Wastes (SwaT) is illustrated below. The management of hazardous waste can be a complex process with materials going through several stages, transfer, storage and treatment before final disposal. The system can be subject to some double counting and as such does not provide a confident estimate of waste arisings per se but a picture of hazardous waste management.

Figure A1: Representation of the SwaT data collection system



A1.2 The Environment Agency has produced an audited data set from SwaT annually since 1999. Figure 2 shows waste production trends over the last five years.

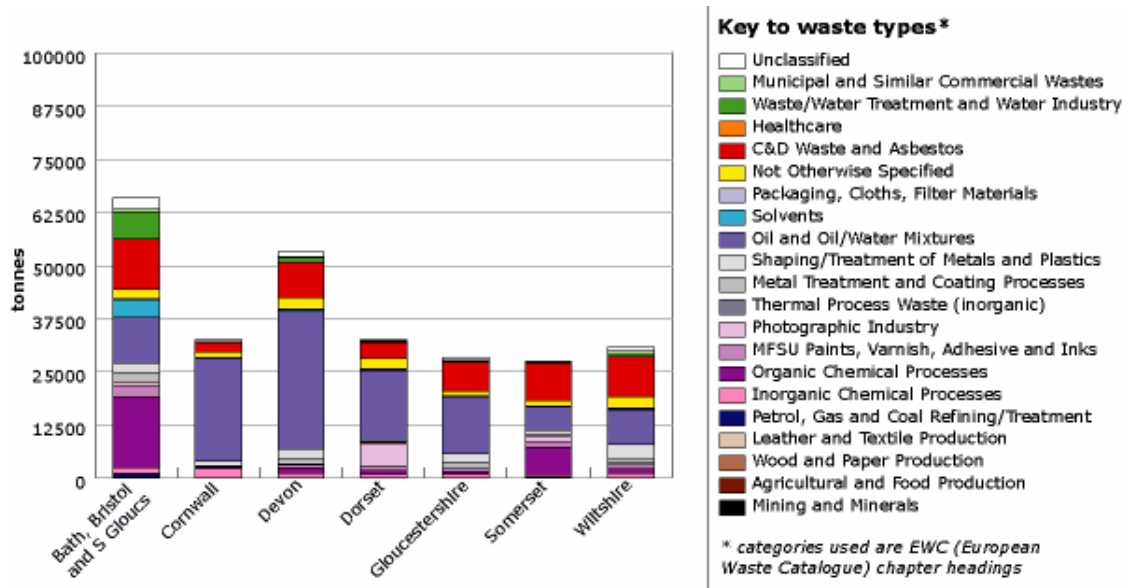
Figure A2: Hazardous waste production trends by SW sub-regions 1999-03



A1.3 Regionally the amount of hazardous waste has gradually fallen over the last five years from around 310,000 tonnes to around 285,000 tonnes in 2003. Variability at the sub regional level can be due to such things as a large site clearance at a contaminated redevelopment site but is smoothed when data is aggregated at the regional level.

A1.4 The graph at figure 3 shows that waste production is concentrated in the urbanised sub-regions; **the West of England and Devon which includes Plymouth.** In general two types of waste dominated waste production across all sub-regions, those arising from the construction industry and oil/water mixtures. Waste production at the sub-regions also reflects the type of industry present; Chemical wastes from the industry centred on Avonmouth and oil/water separation from ships bilge's at the ports on the Devon and Cornish coasts.

Figure A3: Hazardous waste produced in 2003 by sub-region and waste type



A1.5 The SwaT system also allows an analysis of waste movements. The map at figure 4 shows the movements of hazardous wastes in the South West in 2003. It is interesting to note the increase in the percentage of wastes retained for management within sub regions moving down the peninsular.

A1.6 Figure 5 shows how wastes are managed in the sub regions. The counties on the regional boundary show considerably more waste managed by either disposal; Gloucestershire and Wiltshire, and waste treatment in West of England. **This reflects the import of waste for disposal and treatment from adjoining regions and the presence of the historic facilities to cater for this extended national commercial need; Landfill sites in Gloucestershire and Wiltshire and waste treatment in the West of England.**

Figure A4: Hazardous waste movements 2003

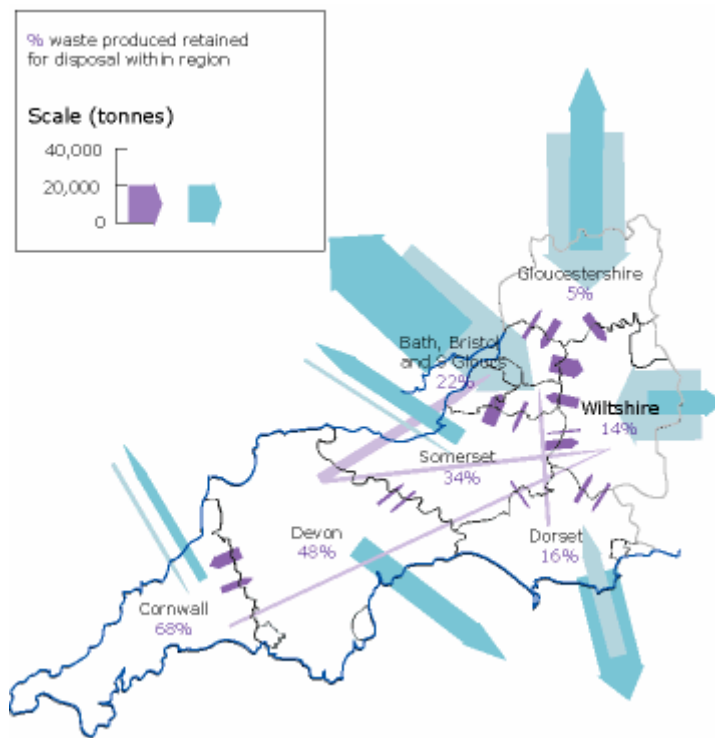
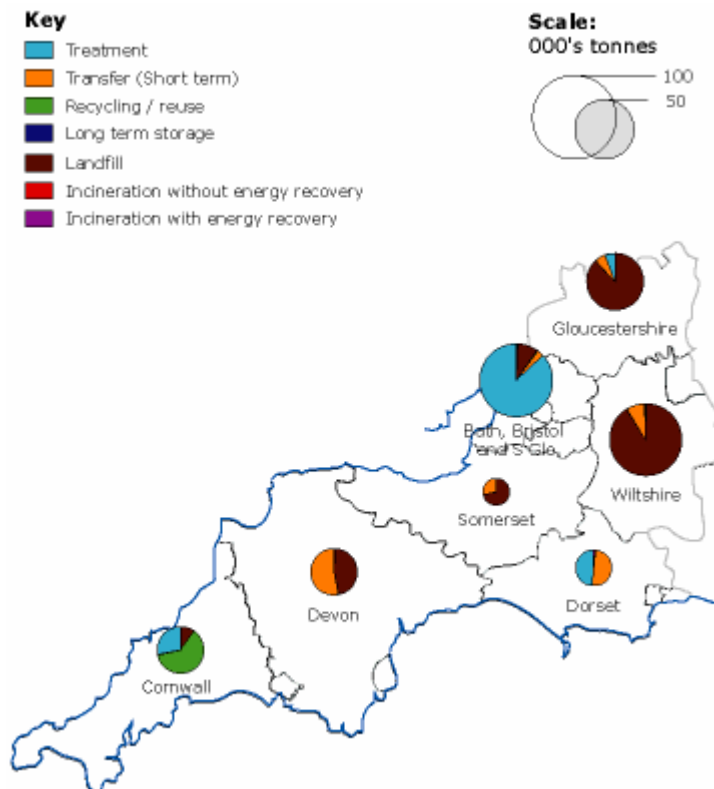
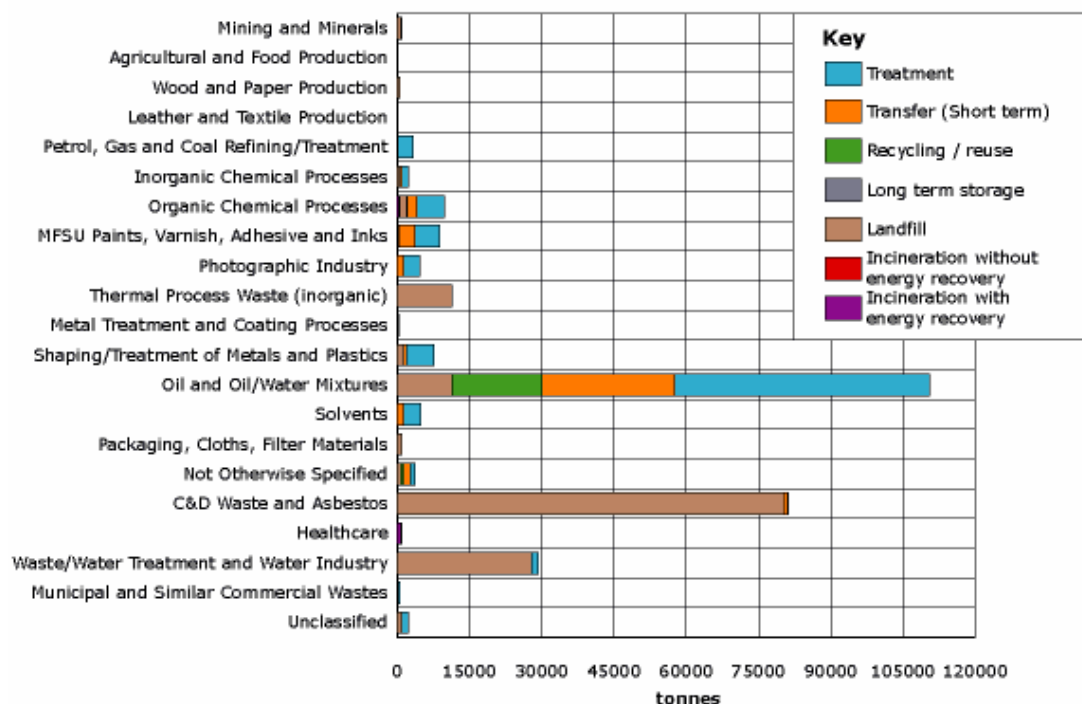


Figure A5: Sub-regional disposal and recovery of hazardous waste 2003



A1.7 The way different wastes are managed is also important. The final graph, Figure 6 below shows that three waste streams dominate the picture. Oil/water mixtures which are predominately treated and recovered, constructions wastes which are overwhelmingly landfilled and residue from waste water treatment which are also invariably landfilled.

Figure A6: Disposal methods for hazardous waste types in the South West 2003



Conclusions

A1.8 The following broad conclusions would seem reasonable based on the previous analysis:

- At the regional level the amount of hazardous waste managed has shown a gradual decline from over 300,000 tonnes to around 284,000 in 2003.
- At the sub regional level hazardous waste management reflects the type of industries present either manufacturing or hazardous waste treatment and disposal, for example the chemical industry at Avonmouth or the presence of landfill capacity in Gloucestershire and Wiltshire.
- Movements of hazardous waste within and between regions are a characteristic of hazardous waste management that reflects the specialist nature of both disposal and treatment.
- No sub region in the South West could be considered self-sufficient in hazardous waste management but each contributes to a national network.

- Wastes from the construction industry and the waste-water treatment industry comprise about half the total and are invariably landfilled.

ANNEX 2

2.0 Hazardous Waste Forum – Treatment and Capacity Model

A2.1 The forum model was developed in co-operation with the Forum membership, not least the ESA, Environment Agency, British Cement Association and Local Authority representatives. As such many of the models key assumptions have been validated and tested during the development process. While any modelling will be based on assumptions and therefore subject to error the Environment Agency believes that there could be significant benefit in following a modelling approach to inform the development of Regional Planning Guidance. The current Hazardous Waste Forum model provides the most up to date analytical tool available.

Model Principals

A2.2 The model is predicated on the key assumption that the existing treatment and recycling pathways will remain available and unaffected by legislative changes. The principal effect of legislative requirements is to change the possible pattern of wastes previously destined for landfill under the old special waste regime.

A2.3 Baseline information available from the SWAT consignment note system informs an initial analysis of waste volumes previously landfilled by assessing the existing hazardous properties of individual waste streams against the requirements of the hazardous waste directive and the European Waste Catalogue. This analysis gives estimated figures for disposal required to meet our obligations under the hazardous waste directive.

A2.4 The most likely alternative treatment routes for special wastes that are currently land filled are then assessed by EWC codes (6-digit code), to provide a capacity by treatment route (to 4-digit code level). The treatment routes considered were:

- Stabilisation/Solidification
- Physico-chemical treatment
- Solvent recovery
- Soil Treatment
- WW treatment works
- HTI
- Co-incineration: use as cement kiln fuel/raw material
- Landfill (i.e. hazardous waste landfill capacity or separate cell in non-hazardous landfill)

A2.5 Wastes are then allocated to the different treatment routes by drawing together information from:

- EA R&D Technical Report P1-484/TR – Hazardous Waste Management Market Pressures and Opportunities: Background Paper;

- The Agencies: Guidance on the Waste Treatment Requirements of Article 6(a) of the Landfill Directive;
- EC Waste Acceptance Criteria
- Information gathered by ESA from its members; and
- Information supplied by the British Cement Association on the wastes that could be utilised by cement companies either as a fuel or as a raw material substitute. A paper has been produced, but as this could be a critical treatment option further clarification on waste types and quantities is to be sought.
- Professional judgement and discussion with the industry

A2.6 The output is a best estimate of the capacity required by each treatment route for special wastes that are currently landfilled and incinerated.

Key assumptions in this best estimate are:

- Certain waste streams can be landfilled (either hazardous waste landfill or separate cell in non-hazardous waste landfill) without further treatment (because it is treated at the point of production or the treatment does not contribute to the objectives of the Landfill Directive), with the estimate based on waste type;
- One third of contaminated soils can be treated by in-situ or ex-site treatment methods (such as bio-remediation, soil washing etc)
- Stabilisation/solidification will increase the weight of waste by a factor of 2;
- All stabilised/solidified waste remains hazardous;
- Physico-chemical treatment will produce a residue requiring landfill equivalent to 75% of the waste input by weight;
- Changes to the SFP will transfer some wastes from HTI to Co-incineration (estimated based on waste types).
- Waste from stabilisation/solidification treatment processes will be suitable for SNRHW cells.

ANNEX 3

A3.0 APC modelling

A3.1 The model to assess potential requirements for the disposal of hazardous APC residues assumes:

- Sub-regional arisings are as set out in Appendix C of the Regional Waste Strategy
 - Sub –regional Authorities meet the diversion targets set out in Appendix 3 in target years.
 - Kerbside diversion of green and paper waste contributes 100% diversion for the purposes of Landfill Directive Targets
 - Authorities continue to landfill municipal waste to their allowed maximum
 - Only residual municipal waste that is not diverted at the kerbside or allowed to be landfilled is available for thermal treatment.
 - Minimum case scenario represents a 25% diversion to thermal treatment. Maximum case is 75%.
 - 3.5% by weight of waste input becomes hazardous APC residue.
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