

Defra's WEEE (Waste Electrical and Electronic Equipment) & Hazardous Waste Reports

INFORMATION & BRIEFING

Summary

1. Defra commissioned two research studies to improve understanding and provide clarity on the hazardousness of items of domestic Waste Electrical and Electronic Equipment (WEEE) likely to be delivered to Household Waste Recycling Centres (HWRCs - formerly known as Civic Amenity sites).
2. Both studies were carried out by AEA Technology plc and examined the hazardous content of WEEE with respect to the European Union (EU) WEEE Directive and the EU Hazardous Waste List.
3. Together the reports indicated that cathode ray tubes (CRTs), fluorescent tubes, nickel cadmium (NiCd) batteries and fridges generally need to be managed as hazardous waste and particular attention should be paid when encountering extremely old items.
4. The first report published in 2004 gave details of a desk study that recommended practical dismantling and chemical analysis to determine the potential hazardousness of certain indeterminable items such as magnetrons in microwaves, brominated flame retardants (BFRs), liquid crystal displays (LCDs), printed circuit boards, electrolytic capacitors and removable batteries.
5. The second report published in July 2006 concluded that, apart from those items indicated in paragraph 3 above, in general domestic WEEE items were unlikely to present problems at a HWRC with respect to the hazardousness of the items or their components.
6. Defra aims to develop guidance based on the findings of the reports - for local authorities (HWRCs), treatment facilities, recyclers and other interested parties - in identifying WEEE and hazardous WEEE. The guidance is intended to be available later in 2006.
7. The reports are available via the following link
www.defra.gov.uk/environment/waste/topics/electrical/index.htm

Q&A

Q1 *What WEEE is hazardous?*

A1 Based on the investigations made, the reports concluded that fridges containing CFCs, HCFCs or HFCs, fluorescent tubes, cathode ray tubes

(CRTs) and nickel cadmium (NiCd) batteries (commonly found as battery packs for power tools) are classifiable as hazardous waste.

Q2 How was it decided which WEEE items to investigate?

A2 A decision was taken based on the frequency of items occurring at Household Waste Recycling Centres (HWRCs – formerly known as Civic Amenity sites) whilst making sure that the components of concern (identified in the first report) were addressed. Budget constraints were a deciding factor in selecting the amount and types of WEEE items investigated but it is not considered that any significant issues were overlooked.

Q3 Will waste producers and others be able to rely on the findings in the reports as the basis for not testing or consigning waste?

A3 Yes, it was the intention of Defra to clarify the situation regarding the hazardousness of WEEE items and components. The findings, with the caveats of age of item applied, can be relied on by those making decisions on how to handle WEEE items.

Q4 Can non-hazardous WEEE be consigned from the UK to other countries?

A4 This should not be assumed. The lists of waste and the associated control regimes that apply to international movements of waste are different to those that apply to WEEE for domestic purposes. The EC Waste Shipment Regulations (1030/2006/EC), which applies directly in Member States, contains the lists of waste that apply to international movements of WEEE and sets out the relevant controls. For further advice please contact the Environment Agency, Scottish Environment Protection Agency or Environment and Heritage Service (Northern Ireland).

Q5 The reports' findings are based on investigations into a small sample of items showing up at Household Waste Recycling Centres. Is this representative or conclusive? How much weight does Defra give to the findings in these reports and how confident should those who have waited for this information be in the findings?

A5 It is fair to say that Defra has used the resources available to bring as much clarity to the issue as possible. Defra is confident in the research outcomes in the areas that it has given attention to and with the samples available. The list of hazardous WEEE items and components will never be exhaustive but it is expected that this information will be welcomed by those interested in the outcomes of the research.

Q6 Changes to manufacturing processes may mean that some fluorescent tubes do not exceed the threshold for dangerous substances specified in the Hazardous Waste List and are therefore not hazardous under the Hazardous Waste Regulations. What is Defra's position on this change?

A6 Fluorescent tubes are currently classified as hazardous waste. The Hazardous Waste Regulations allow the Secretary of State to determine that a waste listed as "hazardous" may be treated as "non-hazardous" if it does not display hazardous properties above any relevant threshold. Defra would ask to see any evidence that fluorescent tubes do not display hazardous properties and would look carefully at it to decide whether it is appropriate for the Secretary of State to determine that tubes are not hazardous. In the meantime, fluorescent tubes should continue to be handled as hazardous waste.

Q7 What do the reports say about brominated flame retardants (BFRs) commonly found in WEEE and most specifically what does they say about Deca-BDE?

A7 BFRs are typically found in circuit boards and plastics. The reports indicate that there was no consensus in Europe as to whether these compounds do present an environmental problem or not but there was no evidence of persistence or bioaccumulation characteristics giving rise to concern from these initial studies. Scientific studies and risk assessments are being continued at EU level including assessment of Deca-BDE. While these studies did not specifically look at Deca-BDE, the latest research undertaken by the European Commission in this area suggests that no environmental risk from its use has been proven and thus it should be exempt from the Restriction of Hazardous Substances Directive (RoHS). Manufactures are reducing their use of BFRs, partly as a result of bans now imposed on marketing and use of certain BFRs above low concentrations. One issue will be how to distinguish between those items of WEEE containing them and those which do not.

Q8 Are liquid crystal displays (LCDs), particularly those where gas discharge lamps are used to backlight small LCDs, hazardous?

A8 Ten laptop computers and one flat screen TV were dismantled. The second report concluded that the presence of liquid crystals did not exceed the hazardous waste threshold limits in either the LCD panels or the whole WEEE item investigated. While some mercury was present in backlights this was insufficient to classify the LCD as a hazardous waste. However, as a separate component any fluorescent tube removed (i.e. backlights) would be classified as activated glass (i.e. coated glass) and therefore would need to be dealt with as a hazardous waste.

Q9 What do the reports say about removable batteries?

A9 The types of batteries found during the dismantling processes were nickel cadmium (NiCd), nickel metal hydride (NiMH) and lithium ion batteries. NiCd batteries are hazardous by virtue of their cadmium content. NiMH batteries should be considered hazardous if removed, as the second report shows that the hazardous waste threshold limit for nickel and nickel compounds are

exceeded for those batteries which were removed from the item and tested. Lithium ion batteries should be considered as hazardous if removed because the second report shows that the hazardous waste threshold limit for manganese dioxide is exceeded. Defra is discussing the implications of these results with the Environment Agency given the previous information on NiMH and lithium ion batteries suggested they were non hazardous. In the meantime, NiMH and lithium ion batteries removed from WEEE should in general be coded under the EWC entry 20 01 33*.

Q10 What did the reports conclude about lead stabilizers in plastics used in WEEE and to what extent are they are deemed hazardous?

A10 The XRF (X-ray fluorescence spectrometer) plastics analysis provided an extremely useful non-destructive method for checking for the presence of metals in plastics. This technique detected significant levels of lead in external cables (present as lead stabilizers - commonly, lead stearate). Currently, there is no definitive research on the hazardousness of lead stabilizer, therefore, as a precautionary measure and where reuse of the item is not possible, external cables should be removed

Q11 What do the reports say about mobile phones?

A11 The research studies did not look at mobile phones. See also Q2.

Q12 Where can I find out more information generally on Hazardous Household Waste?

A12 The National Household Hazardous Waste Forum has information on its web site about HHW and its management and has produced a number of useful guides including one for HWRCs . The Forum's website is www.nhhwf.org.uk

BACKGROUND

General

1. Estimates suggest the UK produces around 900,000 tonnes of WEEE per year from domestic sources alone; additional WEEE arises from shops, offices and industrial premises.
2. The WEEE Directive (2002/96/EEC) aims to increase the separate collection, reuse, recovery and recycling of waste from electrical and electronic equipment.
3. The WEEE Directive sets out minimum technical requirements for the treatment of the WEEE at authorised treatment facilities prior to recycling and recovery of materials, and specifies a number of de-polluting activities that must be carried out.

4. Some WEEE will be classified as hazardous waste under the revised European Community Hazardous Waste List transposed in England by the List of Waste (England) Regulations 2005.
5. Hazardous wastes are subject to controls and management in accordance with the Hazardous Waste Directive (91/689/EEC), which is transposed in England by the Hazardous Waste (England and Wales) Regulations 2005.
6. With effect from July 2004 hazardous waste and non-hazardous waste could no longer be disposed of in the same landfill, including separately collected fractions of hazardous household waste. Hazardous waste is now subject to treatment and acceptance criteria before it may be disposed at a landfill permitted to take it.
7. The de-polluting activities under the WEEE Directive are narrower in scope than the hazard classifications under the Hazardous Waste List i.e. de-pollution as required by the WEEE Directive will not necessarily result in the removal of all hazardous components.

WEEE & Hazardous Waste Reports produced for Defra by AEA Technology plc (March 2004 & (Part 2 - June 2006)

8. Defra commissioned a research project in September 2005 which aimed to build on the findings of the first research project which produced in March 2004.
9. Both reports concentrated on identifying the potential hazardousness of domestic WEEE items and their components.
10. The first report, essentially desk-based research, scoped available information on the hazardousness of WEEE and its components and identified areas of unknowns where further investigation was merited.
11. The first report concluded that on the basis of assessments, the findings obtained confirmed that the removal and treatment requirements of Annex II of the WEEE Directive were generally in line with the Hazardous Waste Directive.
12. However, it was considered that some components that are not specified in Annex II of the WEEE Directive may be hazardous, and may need to be removed to render the WEEE item non-hazardous. Further investigation was therefore recommended in the report; (i) where no information had been found about a particular WEEE item, & (ii) to clarify the “unknowns” by way of practical analysis.
13. The second report was commissioned to look into the potential hazardousness of “unknown” areas identified in 1st report i.e. magnetrons in microwaves, LCDs (particularly where gas discharge lamps are used to

backlight small LCDs), BFRs (brominated flame retardants), TBBPA (largest volume BFR), phthalate plasticizers, lead stabilizers, printed circuit boards, mercury (when found in thermostats, switches and tilt switches), electrolytic capacitors & batteries built into equipment.

14. The second report was also commissioned to look into a range of WEEE items which were most likely to appear at a Household Waste Recycling Centre (HWRC).
15. The range and number of WEEE items investigated was limited necessarily by the budget which was available. 157 WEEE items were dismantled: microwave (15), bread maker (3), clock (2), fan (3), fat fryer (2), iron (10), sewing machine (4), toaster (11), vacuum cleaner (15), watch (3), answering machine (2), calculator (4), cordless telephone (3), laptop computer (10), printer (9), DVD player (3), flat screen TV (1), musical keyboard (4), satellite tuner (6), stereo (4), VCR (2), video camera (3), light fitting (10), drill (6) lawnmower (10), plane (1), sander (1), strimmer (4), PS Joypad (1), track race set (2) & smoke alarm (3).
16. It was not the aim of the projects to look into appropriate treatment for hazardous WEEE items or components. Defra will be consulting separately on this issue under the Draft Guidance on Best Available Treatment, Recovery and Recycling Techniques (BATRRRT) and Treatment of WEEE.
17. Defra aims to develop guidance based on the findings of the reports for local authorities (HWRCs), treatment facilities, recyclers and other interested parties in identifying WEEE and hazardous WEEE. The guidance is intended to be available later in 2006.