eWASA

Technical Guidelines on the recycling of electrical and electronic equipment

PART I GENERAL TECHNICAL GUIDELINES

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PART I GENERAL TECHNICAL GUIDELINES

A. General

A.1 Purpose

A.1.1 The aim of these technical Guidelines is to put measures needed in place to protect the environment and human health by preventing or reducing the adverse effects of the recycling of waste electrical and electronic appliances.

A.1.2 These technical regulations will contribute towards closing material cycles, thereby reducing the consumption of natural resources.

A.1.3 These technical regulations are an integral part of the recycling contract on environmentally-friendly treatment of waste electrical and electronic appliances concluded between eWASA and the recycling company.

A.1.4 These technical Guidelines stipulate the processing requirements and special obligations of the recycling companies, and observance of these is assessed by eWASA Technical Control Committee (TCC) via a bi-annual auditing process.

A.2 Scope

A.2.1 These technical guidelines are valid for all waste electrical and electronic equipment (WEEE) and appliances, as well as their components, as defined in the European WEEE Directive.[i1]. These technical Guidelines are valid for the entire collection and treatment chain, from receipt of the appliances to manufacturing of the final fractions being recovered or disposed of. Additional requirements are defined for specific appliance categories in the Directives in Part 2 of this document.

A.2.2 The recycling company is responsible for ensuring that the supplier companies working on its behalf, and fraction consumers, fulfil the requirements stated in the technical regulations for external further treatment.

A.2.3 Waste electrical and electronic appliances are subject to the technical Guidelines insofar as they still contain cables, electronic components and other hazardous components. Casing made from metals, contaminant-free plastics or wood is scrap and is not subject to the technical Guidelines.

A.3 Definitions

A.3.1 *'e-waste'* means as defined in the generic term used that embraces all types of waste containing electrically powered components. e-Waste contains both valuable materials as

[1] Directive 2002/96/EC of the European Parliament and of the council on Waste Electrical and Electronic Equipment

well as hazardous materials which require special handling and recycling methods (General Waste Management Facility Standards, GDACE 2009).

A.3.2 *'Decontamination'* is the process during which hazardous waste components are removed from e-waste

A 3 .3 *'Recycle'* means as defined in , a process where waste is reclaimed for further use, which involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material (National Environmental Management Waste Act, 2008).

A.3.4 *'Treatment'* means, as defined in ,any method, technique or process that is designed to –

(a) change the physical, biological or chemical character of a waste or,
(b)remove, separate, concentrate or recover a hazardous toxic component of waste, or
(c) destroy or reduce the toxicity of a waste
In order to minimise the impact of the waste on the environment prior to further use or disposal (National Environmental Management Waste Act, 2008)disposal.

A3.5 '*Hazardous waste'* means, as defined in the National Environmental Management Waste Act, 2008 any waste that contains organic and inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment ().

A.3.6 *'Materials'* are, considered to be natural elements or chemical elements manufactured through a production process, as well as their compounds. Equivalents to these are preparations (mixtures, compounds, solutions) and items containing such materials.

A.3.7 '*Material flow'* means the movement and storage of materials, items and secondary products (mass, piece) per time unit, taking into account dismantling and conversion.

A3.8 '*Precautionary Principle'* means as defined in Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, Second Edition 1998, Where that where a risk is unknown, the worst case situation is assumed and provided for.

A3.9 *'Radioactive Substances'* means as defined in substances which emit or exhibit radioactivity in excess of 74 Becquerels per gram (Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, Second Edition 1998). These substances must be disposed of in terms of the Nuclear Energy Act (Act 92 of 1982) and the Hazardous Substances Act (Act 15 of 1973). In particular Section 3A, Hazardous Substances Act (Act 15 of 1973) regulates radioactive substances used for medical, scientific and industrial purposes.

A.3.10 The *technical control committee* assesses the observance of the technical guidelines on the recycling of electrical and electronic appliances at the recycling companies. This committee is tasked by the eWASA Board to develop standard and monitor advances in technology on an ongoing basis.

A3.11 *'Waste'* means, as defined in any substance, whether or not that substance can be reduced, re-used, recycled and recovered –
(a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of
(b) which the generator has no further use of for the purposes of production

(c) that must be treated or disposed of; or
(d) that is identified as a waste by the Minister by notice in the *Gazette*, and includes waste generated by the mining, medical or other sector, but
(i) a by-product that is not considered waste, and
(ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste (National Environmental Management Waste Act, 2008).

B. Legal compliance:

B.1 Legal background

Refer to A Review of South African Environmental and General legislation covering e-waste by Mark Dittke for eWASA first published in 2007 and updated in Aug 2009 for more detailed discussion of the legislation listed below.

Legislation	Summary
South African Constitution (Act 108 of 1996)	Section 24 of the Constitution's Bill of Rights states that: *Everyone has the right-* *(a) to an environment that is not harmful to their health or well-being; and* *(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-* *(i) prevent pollution and ecological degradation;* *(ii) promote conservation; and* *secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*
The National Environmental Management Act, 107 of 1998 (NEMA)	This Act (hereafter referred to as NEMA) is the framework legislation governing environmental matters and all other related legislation must be read subject to its provisions. While NEMA does not deal much with waste management per se, it nonetheless sets out some important provisions. Thus sustainable development requires the consideration of, among other factors: *that waste is avoided, or where it cannot altogether be avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner* (section 2(4)(a)(iv)). It also defines "pollution" as *any change in the environment caused by-* *(i) substances;* *(iii) noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future* (section

	1). There is a duty on persons to take reasonable measures to prevent pollution or degradation of the environment from occurring, continuing or recurring, or in so far as such harm is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment (section 28(1)). This duty rests on, among others, the land owner, person in control or user thereof (section 28(2)). The Act also requires the application of integrated environmental management principles and objectives set out in Chapter 5 (this deals with environmental impact assessments (EIAs)). The requirements pertaining to the EIA Regulations dealing environmental impact assessments (EIA's) will be discussed below since the law, in so far as waste management is concerned, has changed drastically since 1 July 2009 with the promulgation of the Waste Act, 59 of 2008, and accompanying legislation.
The Municipal Services Act, 32 of 2000	Includes principles for effective local governance.
The Occupational Health and Safety Act, 85 of 1993	Deals with health and safety in the workplace.
National Environmental Waste Management Act, 59 of 2008	Since the promulgation of the Waste Act, 59 of 2008, the Environment Conservation Act has little remaining relevance for waste management due to the repeal of the definitions of "waste" and the separate Identification of Matter as Waste Notice, GN 1986 of 24 August 1990. In addition, the provisions dealing with the permitting of disposal sites (section 20) were repealed by the Waste Act, although currently permitted sites will retain their legal status (see sections 81 and 82 of the latter Act). In other words, any permission issued in terms of section 20 will either remain valid until further notice, alternatively will require a licence in terms of the Waste Act, as read together with Notice GN 718 of 3 July 2009 (*List of Waste Management Activities that have or are likely to have a Detrimental Effect on the Environment*).
Framework for the National Waste Management Strategy (2009); White Paper on Integrated Pollution and Waste Management (2000); National Waste Management Strategy and Action Plans (1999)	All three documents advocate a shift from the present focus on waste disposal and impact control (i.e. end of pipe) to integrated waste management and prevention as well as minimisation. The Framework for the National Waste Management Strategy specifically mentions e-waste, and states that it (as well as some other products) should be prioritised for further investigation and implementation for extended producer responsibility.
Waste Act, 50 of 2008	This Act entered into force on 1 July 2009 (with the exception of some sections which are not relevant for present purposes). It requires the Minister to draft a National Waste Management Strategy (a Framework was already published in June 2009), as well as national norms and standards. It is unsure if this will replace the existing 1999

strategy, or if same will only be updated. Provinces must ensure that these norms and standards are put into place within their areas, although MECs are free to draw up their own norms and standards. Municipalities in turn must compile waste service standards, while certain state organs must put together integrated waste management plans.
In terms of section 14(1)

The Minister may, by notice in the Gazette, declare a waste to be a priority waste if the Minister on reasonable grounds believes that the waste poses a threat to health, well-being or the environment because of the quantity or composition of the waste and—
(a) that specific waste management measures are required to address the threat; or
(b) that the imposition of specific waste management measures in respect of the waste may improve reduction, re-use, recycling and recovery rates or reduce health and environmental impacts.

The consequence of such declaration is that

No person may import, manufacture, process, sell or export a priority waste or a product that is likely to result in the generation of a priority waste unless that waste or product complies with—
(a) the waste management measures contemplated in section 14(4);
(b) an industrial waste management plan; or
(c) any other requirement in terms of this Act.

A general duty in respect of waste management is set out in section 16 which states that:

(1) A holder of waste must, within the holder's power, take all reasonable measures to—
(a) avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;
(b) reduce, re-use, recycle and recover waste;
(c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
(d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
(e) prevent any employee or any person under his or her supervision from
contravening this Act; and
(f) prevent the waste from being used for an unauthorised purpose.
(2) Any person who sells a product that may be used by the public and that is likely to result in the generation of hazardous waste must take reasonable steps to inform the public of the impact of that waste on health and the environment.

This section clearly is important for consumers, suppliers, manufacturers, refurbishers and recyclers of electronic and electrical equipment.
Reduction, re-use, recycling and waste recovery are dealt with in section 17 which reads as follows:

(1) Unless otherwise provided for in this Act, any person who undertakes an activity involving the reduction, re-use,

recycling or recovery of waste must, before undertaking that activity, ensure that the reduction, re-use, recycling or recovery of the waste—
(a) uses less natural resources than disposal of such waste; and
(b) to the extent that it is possible, is less harmful to the environment than the disposal of such waste.
(2) The Minister may, after consultation with the Minister of Trade and Industry and by notice in the Gazette, require any person or category of persons to—
(a) provide for the reduction, re-use, recycling and recovery of products or components of a product manufactured or imported by that person; or
(b) include a determined percentage of recycled material in a product that is produced, imported or manufactured by that person or category of persons.

Section 18 deals with extended producer responsibility and states that:
(1) The Minister after consultation with the Minister of Trade and Industry may, in order to give effect to the objects of this Act, by notice in the Gazette—
(a) identify a product or class of products in respect of which extended producer responsibility applies;
(b) specify the extended producer responsibility measures that must be taken in respect of that product or class of products; and
(c) identify the person or category of persons who must implement the extended producer responsibilities measures contemplated in paragraph (b).
Section 18(2) allows the Minister to specify by notice, among others:
(2) (a) the requirements in respect of the implementation and operation of an extended producer responsibility programme, including the requirements for the reduction, re-use, recycling, recovery, treatment and disposal of waste;
(b) the financial arrangements of a waste minimisation programme, with the concurrence of the Minister of Finance;
(c) the institutional arrangements for the administration of a waste minimisation programme;
(d) the percentage of products that must be recovered under a waste minimisation programme; (e) the labelling requirements in respect of waste;
(f) that the producer of a product or class of products identified in that notice must carry out a life cycle assessment in relation to the product, in such manner or in accordance with such standards or procedures as may be prescribed; and
(g) the requirements that must be complied with in respect of the design, composition or production of a product or packaging, including a requirement that—
(i) clean production measures be implemented;
(ii) the composition, volume or weight of packaging be restricted; and
(iii) packaging be designed so that it can be reduced, re-used, recycled or recovered
"Extended producer responsibility measures" is defined in the Act as

measures that extend a person's financial or physical responsibility for a product to the post-consumer stage of the product, and includes—
(a) waste minimisation programmes;
(b) financial arrangements for any fund that has been established to promote the reduction, re-use, recycling and recovery of waste;
(c) awareness programmes to inform the public of the impacts of waste emanating from the product on health and the environment; and
(d) any other measures to reduce the potential impact of the product on health and the environment.

The Minister may publish a list of waste management activities which either require a licence, alternatively must conform to certain standards (section 19). Such a list appeared in the Government Gazette of 3 July 2009).
Part 5 of Chapter 4 regulates the storage, collection and transportation of waste, including duties pertaining thereto, as well as the duties of persons transporting waste. Section 24 (collection of waste) provides that

No person may collect waste for removal from premises unless such person is—
(a) a municipality or municipal service provider;
(b) authorised by law to collect that waste, where authorisation is required; or
(c) not prohibited from collecting that waste.

Section 25 deals with the transportation of waste and requires any person engaged in the transportation of waste to take all reasonable steps to prevent any spillage of waste or littering from a vehicle used to transport waste (section 25(1)).
Section 25(4) states that

(4) Where hazardous waste is transported for purposes other than disposal, a person transporting the waste must, before offloading the waste from the vehicle, ensure that the facility or place to which the waste is transported, is authorised to accept such waste and must obtain written confirmation that the waste has been accepted.

Part 7 of Chapter 4 discusses industry waste management plans. This would be in respect of industries or waste generation activities affecting more than one province. A category of persons or an industry could then be required to draw up and submit such plan for approval by the Minister or MEC (if an activity is carried out in that particular province). Section 30 lists numerous factors which must be considered in the plan. To date no industries were identified by either the Minister or an MEC.
Chapter 5 governs the licensing of waste management activities and largely deals with issues like the application procedure, contents of licences, renewal, revoking, surrender etc. The actual activities which will (or may) require a licence are set out in a separate Notice.

Chapter 6 deals with the mandatory implementation of a national waste information system by the Minister, and the voluntary implementation of a provincial waste information system by a MEC's.

Lastly, in terms of section 69 the Minister has the power to make Regulations dealing with a host of waste related topics. These include, among others:

- waste minimisation
- the obligation of producers to carry out life cycle assessments of their products
- product redesign
- waste reduction by employing different manufacturing methods and the use of alternative materials or products
- labelling requirements
- the dissemination of information to the public
- the financial arrangements of waste minimisation programmes
- requirements in respect of the funding or insuring of a waste management activity

With the entering into force of the Waste Act the following sections of the Environment Conservation Act are repealed: sections 19, 19A, 20, 24, 24A, 24B and 24C. In addition, the definitions of “disposal site” and “waste” were repealed.

List of Waste Management Activities which have, or are likely to have a Detrimental Effect on the Environment, GN 718 of 2009

This Notice was published on 3 July 2009. According to it no person may commence, undertake or conduct a waste management activity listed in the schedule unless a licence is issued in respect of that activity.
As part of the license application an (environmental) assessment must be undertaken. The Notice is divided into Categories A and B.
Category A only requires a Basic Assessment (ie not a “full” EIA) as per GN R 386 of 2006 (the second of three EIA Regulations) for the following:

- Storage of waste
- Reuse, recycling and recovery
- Treatment of waste
- Disposal of waste
- Storage, treatment and processing of animal waste
- Construction, expansion or decommissioning of facilities and associated structures and infrastructure

Category B requires scoping followed by a “full” EIA as per GN R 387 (the third of three EIA Regulations) for the following:

- Storage of hazardous waste
- Reuse, recycling and recovery
- Treatment of waste
- Disposal of waste on land
- Construction of facilities and associated structures and infrastructure

Various quantities and volumes are set out with the individual activities; these should be consulted to determine if a licence is required.
A "facility for a waste management activity" is defined as

a place, infrastructure, structure or containment of any kind, wherein, upon or at, a waste management activity takes place and includes a waste transfer station, container yard, landfill site, incinerators, lagoons, recycling and composting facilities.

Changes to the Environmental Impact Assessment Regulations

GN R 386 and 387 (the second and third of three EIA Regulations) were amended on 3 July 2009 by GN 719 of 2009 repealing those provisions dealing with waste related activities.

Thus those sites which should, or may, have required an environmental authorisation to conduct certain e-waste activities now fall outside the scope of the EIA Regulations; unless one of the other identified activities is taking place which necessitates an EIA as well as an application for a waste management licence.

However, due to the List of Waste Management Activities Notice (see above at 2.15) they will now have to apply for a waste management licence provided the stated quantities and volumes are exceeded (and possibly an environmental authorisation if other criteria apply, although probably unlikely); if not, no licence is needed.

Depending on the nature and size of the waste activities carried out either a Category A or B licence will be required (if the minimum waste volumes are in fact reached). In other words, a Basic Assessment must be performed, alternatively Scoping plus a full EIA.
Nonetheless, in our opinion, the following have potential relevance:

- Waste Act (section 74)
- Regulation 51 of GN 385 of 2009 (the first of three EIA Regulations, and which sets out the procedural steps involved)
- section 24M of the National Environmental Management Act (although this is more restrictive)

all of which allow for exemptions from the provisions of any requirement in terms of either the two Acts or the EIA Regulations.

Section 24G of the National Environmental Management Act which governs the rectification of an unlawful commencement of an activity is relevant for present purposes.
Section 24G (recently amended) states that a person who has committed an offence (ie. commencing an activity without environmental authorisation) may apply to the Minister who in turn may direct the person to compile a report outlining

	(i) an assessment of the nature, extent, duration and significance of the consequences for or impacts on the environment of the activity, including the cumulative effects; *(ii) a description of mitigation measures undertaken or to be undertaken in respect of the consequences for or impacts on the environment of the activity;* *(iii) a description of the public participation process followed during the course of compiling the report, including all comments received from interested and affected parties and an indication of how issues raised have been addressed;* *(iv) an environmental management programme.* The Minister may thereafter either order the person to cease the activity or grant an environmental authorisation. An administrative fine of up to R 1 million may, however, be imposed.
The Health Act, 63 of 1977 and National Health Act, 61 of 2003	Promotes healthy living and working conditions. Relevant to the potential health risk implications of e-waste. Also deal with disposal of waste, and, amongst other health issues, the "accumulation of refuse…or other matter… injurious or dangerous to health" (Health Act, 63 of 1977, Section 1).
The Hazardous Substances Act, 15 of 1973 and Amendments	This Act classifies certain types of hazardous substances into four groups and imposes detailed requirements (through the use of Regulations and Notices) dealing with the handling, selling, using, operating, applying and installation etc thereof. SANS 10228 (The Identification and Classification of Dangerous Substances and Goods) is incorporated by reference into various Regulations and Notices, and as such this standard is given legal force insofar as these Regulations and Notices are concerned.
DWAF Minimum Requirements, 2nd Edition, 1998	In 1998 DWAF published detailed minimum requirements dealing with waste disposal by landfill, handling, classification and disposal of hazardous waste, water monitoring at waste management facilities. Also deals with storage of hazardous waste. Certain hazardous components in e-waste, like eg. mercury, cadmium, lead etc, will probably be regarded as a Class 6.1 dangerous substance in terms of SANS 10228 (*The Identification and Classification of Dangerous Substances and Goods*). Disposal of hazardous waste may only take place at an authorised landfill (ordinarily rated as H:H), although current practice certainly is different due to lack of awareness, and possibly unwillingness, by authorities and the public, as well as little or no controls at landfill sites. Storage of hazardous waste is dealt with extensively in Section 10 of the *Minimum Requirements*, and certain precautionary measures and steps are outlined. The *Minimum Requirements* also set out storage times (Section 10.2) and volumes (depending on the hazard

	rating). If storage is in excess of ninety days a waste disposal site permit will need to be applied for by the *waste generator* in terms of section 20 of the Environment Conservation Act, although the Minister may grant an exemption from this requirement. As mentioned above, section 20 has been repealed by the Waste Act, and the *Minimum Requirements* must therefore be read subject to this Act.
National Water Act, 36 of 1998	Act includes a reference to "Disposing of waste in a manner which may detrimentally impact on a water resource" (section 21(g)), which could have implications for e-waste management.
Atmospheric Pollution Prevention Act, 45 of 1965	When the Air Quality Act, 39 of fully enters into force, this Act will be repealed. In the meantime it remains important for purposes of this review as it requires a registration certificate for certain so-called scheduled processes. For present purposes the following are potentially relevant, depending on the activity involved: • Lead processes (No 23) • Copper processes (No 31) • Waste incineration processes (No 39) • Cadmium processes (No 52) • Metal recovery processes (No 54) • Mercury process (No 62) • Glass processes (No 65)
Air Quality Act, 39 of 2004	This Act is only partially in force. It aims to improve air quality, although standards and control were still being formulated. Smelters, in particular, are likely to be affected. Once the licensing provisions enter into force they will replace the registration certificates currently issued in terms of the Atmospheric Pollution Prevention Act.
Occupational Health and Safety Act, 85 of 1993, and Regulations	Regulates the health and safety of employees and the public in general. Amongst other things, employers are obliged to carry out risk and hazard assessments on a regular basis to determine any dangers posed by the work or materials used. In addition, several Regulations promulgated in terms of the Act contain provisions dealing with the handling, use, exposure control, use of personal protective equipment, storage or disposal of hazardous substances/chemicals or waste in general. Examples are the: 1. Lead Regulations, GN R 236 of 28 February 2003 2. Hazardous Chemical Substances Regulations, GN R 1179 of 25 August 1995 3. Environmental Regulations for Workplaces, GN R 2281 of 16 October 1987 4. General Safety Regulations, GN R 1031 of 30 May 1986 The Lead Regulations as well as Hazardous Chemical Substances ("HCS") Regulations both deal in Regulations 17 and 15 respectively with disposal, and require that an

employer, as far as is reasonably practicable, should recycle lead or HCS waste, alternatively dispose of it in a safe and lawful manner.
The other two Regulations set out general requirements for employers insofar as housekeeping, ventilation/indoor air quality, illumination, personal protective equipment and other safety measures are concerned.

Precious Metals legislation

The Precious Metals Act, 37 of 2005, entered into force on 1 July 2007.
It defines a precious metal as:

(a) the metal gold, any metal of the platinum group and the ores of such metals; and

(b) any other metal that the Minister has declared by notice in the Gazette to be a precious metal for the purposes of this Act, and the ores of any such metal.

The Act repeals the Mining Rights Act, 1967.

The South African Diamond and Precious Metals Regulator has now been established (albeit in terms of the Diamonds Act, 56 of 1986), and whose function is to issue licences and permits. The Regulator's functions are to implement, administer and control all matters relating to acquisition, possession, smelting, refining, fabrication, use and disposal of precious metals.

Prior permission will have to be obtained for:

- acquiring, possessing or disposing of unwrought metal
- acquiring, possessing or disposing of semi-fabricated precious metal
- refining
- precious metal benefication
- jewellers
- importing precious metals

Authorised dealers require a certificate from the Regulator who may only issue this in consultation with the National Treasury, in the case of gold, and the National Commissioner of the South African Police Service (section 4(4)). Dealers may only buy precious metal in any form from a person authorised to dispose of semi-fabricated or unwrought precious metal in terms of the Act after such person has shown the dealer a licence, permit, mining or prospecting right or certificate authorising that person to dispose of such precious metal (section 14(1)).
The transportation and conveyance of semi-fabricated or unwrought precious metal outside the boundaries of any mine, works or other property or place where such metal is mined, refined or worked with, is prohibited unless a person is in possession of prescribed documentation (section 13).
Every holder of a refining licence or a precious metal beneficiation licence, authorised dealer or producer who deposits for safe-keeping, receives, despatches or otherwise disposes of unwrought precious metal must keep a true and correct register in the prescribed form and for the prescribed period of all such precious metal deposited (section 15(1)(a)). A true copy in duplicate of the register must be submitted quarterly to the Regulator, together with an affirmation or a solemn declaration of the correctness thereof (section 15(2)).

Precious Metals Regulations, GN R 570 of 2007, were promulgated on 9 July 2007 (subsequently amended by GN R 387 of 2008). These set out in detail the formalities to be followed during licence or permit applications, as well as the contents and terms of such documents. For review purposes the Regulations are not relevant.

Second-Hand Goods legislation

The Second-Hand Goods Act, 6 of 2009, although signed by the President and published on 1 April 2009, is not yet in force at the time of writing.
Therefore, should an e-waste recycler or smelter be regarded as a dealer any smelting or melting activities would be regarded as illegal.
"Goods" are defined as

goods specified in Schedule 1, but do not include firearms or ammunition as defined in the Firearms Control Act, 2000 (Act No. 60 of 2000) or clothing.

Schedule 1 lists the following as goods:

- *Jewellery, including unwrought precious metal as defined in the Precious Metals Act, 2005*
- *Agricultural implements, including tractors, ploughs and harvesters, irrigation equipment or any part or accessory thereof*
- *Bicycles or any part or accessory thereof*
- *Household and office equipment*
- *Factory equipment and machinery or any part or accessory thereof*
- *Tyres of any vehicle or motorcycle*
- *Communication equipment or any part or accessory thereof*
- *Photographic or optical instruments or any part or accessory thereof*
- *Any controlled metal, or any wrought article, or any article or substance consisting wholly or principally of one or more of such metals*
- *Antique goods*
- *Motor vehicle or any part or accessory thereof*
- *Vehicles or any part or accessory thereof*

Sporting equipment

- *Valuables*
- *Books*
- *Shop-fitting equipment*

"Household and office equipment" includes
communication equipment, electric and electronic equipment and appliances, electronic software, furniture, gardening equipment, tools, books, valuables, clothing and works of art.
A "dealer" is

a person who carries on a business of dealing in second hand goods, and includes a scrap metal dealer and a pawnbroker.

"Recycle" means

to melt, smelt, granulate, shred, dismantle, sort, grade,

cut or prepare, either by hand or by the use of specialised plant, machinery and equipment, for use by consuming works such as foundries, mills, smelters, refiners, and manufacturers.

"Second-hand goods" means

goods which have been in use by a person other than the manufacturer or producer thereof or a person dealing therewith for such manufacturer or producer in the course of business, but does not include goods with a value of less than R100.

"Scrap metal" includes

any used, broken, worn out, defaced or partly manufactured goods made wholly or partly of non-ferrous or ferrous metal, lead or zinc or any substance of metallic waste or dye made of any of the materials commonly known as hard metals or of cemented or sintered metallic carbides.

Every dealer must register with the National Commissioner of the South African Police Service (section 2), who in turn must issue a registration certificate (section 7). Should the dealer operate from more than premises a separate certificate must be issued for each premises (section 7).

A dealer must keep a register in the prescribed form and record in the register the prescribed particulars regarding every acquisition or disposal of second-hand goods (section 21(1)). Furthermore, no dealer may deliver goods acquired by him or her to a person or change the form or alter the appearance thereof for at least seven days from the date of acquisition (section 23(1)(d)).

Recyclers of controlled metals must apply to be registered as recycler (section 25(1)). This is in addition to being registered as dealer.

Controlled metals as per Schedule 2 to the Act are

Copper, aluminium, zinc, chrome, lead, white metal, nickel, tungsten, tin, ferrovanadium, ferrosilicon, ferrochrome, brass, bronze, cobalt and precious metals as defined in the Precious Metals Act, 2005 (Act No. 27 of 2005), or any article consisting wholly or principally of any of those metals.

According to section 25(4)(a)

No person may—

(a) have in his or her possession any apparatus which can be used for the recycling of any controlled metal or any article or substance containing any controlled metal, unless -

(i) such person is registered as a recycler; or

(ii) in the case of precious metals, such a person is authorised to possess and recycle precious metals under the Precious Metals Act, 2005 (Act No. 37 of 2005), or any other applicable legislation.

Moreover, it is prohibited to acquire or dispose of any cable consisting of a controlled metal of which the cover has been burnt, unless the seller is able to provide a reasonable explanation for the burnt cover. The recycler must also first report this to a police official (section 25(4)(a)).

Draft Regulations were published around 2006/2007; these deal with certificate and dealer registration requirements. In addition, separate Draft Regulations were published very

	recently governing dealers' associations. Their aim is to introduce greater control over certain second-hand goods sectors, and to implement a degree of self-regulation and policing. The following sectors would potentially be affected (Regulation 5(5)): (a) general dealers; (b) auctioneers; (c) jewellers; (d) motor vehicle dealers; (e) scrap metal dealers; (f) recyclers; (g) franchise holders; or (h) any other type of association that would describe the main activities of members of such an association. Therefore should these Draft Regulations ever enter into force, e-waste recyclers or refurbishers will be required to form a dealers' association.
Consumer Protection Act, 68 of 2008	Although having been signed by the President on 29 April 2009 the Act will only enter into force on 24 October 2010. No Regulations were drafted, but it is expected that this will take place shortly. As the Act is very detailed only the salient points for purposes of this review will be mentioned here. Section 59 (Recovery and safe disposal of designated products or components) states that: *(1) If any national legislation prohibits the disposal or deposit of any particular goods, or any components, remnants, containers or packaging of any goods, into a common waste collection system—* *(a) any person who in the ordinary course of business supplies goods of that kind to consumers, must accept the return of any such goods, components, remnants, containers or packaging from any consumer, without charge to the consumer, irrespective of whether that person supplied the particular object to that particular consumer; and* *(b) any person who in the ordinary course of business produces, imports or distributes any such goods as part of the supply chain by which those goods reach the consumer, must in turn accept the return of any such goods, components, remnants, containers or packaging from any supplier contemplated in paragraph (a).* *(2) If any regulation or industry waste management plan approved by any other legislation for the management of a specific waste type applies, the consumer may dispose or deposit the goods to a collection facility provided for in the regulation or industry waste management plan.* E-waste could be a product or goods covered by future legislation, which would make this Act applicable. Unless such future legislation expressly states that the return by consumers is covered by a fee or deposit it will be for free.

B 2. **Provincial legislation**

Currently there is very little environmental legislation on the provincial level. This generally deals with issues like conservation, land planning and development etc. and not waste management.
KwaZulu-Natal started writing its own Draft Prevention and Management of Waste Bill, but this was never finalised due to the parallel drafting of the national Waste Act.
The Western Cape has begun formulating a hazardous waste policy, but this is not yet finalised. A

policy dealing with household hazardous waste was, however, completed, although it is unsure to what extent it is applied.

Gauteng Draft Standards for General Waste Management Facilities (GWMF) (March 2009)

Gauteng is currently the only province which has such Standards, even though they are still a draft. These proposed Standards are very detailed and cover various types of facilities. With the entering into force of the Waste Act, and the resultant repeal of section 20 of the Environment Conservation Act and parts of the EIA Regulations, as well as the publication of Listed Waste Management Activities requiring a licence, the Standards will, in our opinion, have to be revised in part to bring them in line with the recent legal developments.

For review purposes the following proposed sections are relevant:

> Hazardous waste, other than insignificant amounts of domestic hazardous waste forming part of the general waste stream, should not be accepted at GWMF's (7.1.3)
>
> A GWMF shall not intentionally accept or store hazardous wastes, including batteries, oil, paint, florescent tubes and health care risk waste, unless it has been approved by GDACE to handle the particular waste. Such approvals shall form part of the operating permit. Hazardous waste must be collected and stored in an appropriate manner before being transported and disposed of at a hazardous waste disposal site to prevent pollution of the environment (7.1.3).
>
> E-waste containing ozone-depleting substances may not be accepted or treated at GWMF's (7.1.3).

For new and existing facilities GDACE, following a site visit, will advise the applicant:

- In the case of a *proposed* site, whether it is feasible for the development of a GWMF. If the site is considered feasible, the applicant may proceed with the next phase, which involves drawing up the Permit Application Report. If the site is not feasible, the next best candidate site should be considered.
- In the case of an *existing* GWMF, whether the applicant should apply for a Permit for continued operation, or whether the GWMF must be closed and hence requires to be permitted with a view to closure (10.5)

> In the case of an existing GWMF that is to be permitted, the Feasibility Study will determine whether the site should be permitted for ongoing operation or for closure. The interested and affected parties must be consulted during the study, to obtain their input regarding the future of the GWMF (10.5)

As part of the application process, irrespective of which type of GWMF, detailed site assessments must be conducted, and the EIA Regulations would come into play.

Various layout and building requirements are also proposed in the draft Standards.

B. 3 **Local legislation**

For present purposes only by-laws from the following municipalities will be discussed, as this is where e-waste channels or activities are currently mainly operational:

Cape Town
Johannesburg
Durban (eThekweni)
Pretoria (Tshwane)
Ekurhuleni

The by-law discussion will be more detailed than that covering national legislation as waste management

- water and sanitation services limited to potable water supply systems and domestic waste-water and sewage disposal systems
- refuse removal, refuse dumps and solid waste disposal
- air pollution

have been, and still are, a responsibility delegated to local authorities by the Constitution (Schedules 4 and 5). National legislation, with the exception of the Waste Act, is therefore purposely more general. The actual practicalities are thus normally dealt with in terms of by-laws. It is also for this reason that there are local differences in waste management and enforcement.
When reading all the by-laws dealing with waste the provisions of the Waste Act and subordinate legislation in terms thereof should be kept in mind. Several by-laws would need to be amended to remain in line with the Act.

Cape Town

Integrated Waste Management By-law, PG 6651 of 21 August 2009	Cape Town's Integrated Waste Management By-law was finally published in the Gazette on 21 August 2009 after already having been approved by the City a few months ago. E-waste is not mentioned and as such it would fall under the definition and treatment of hazardous waste. The Waste Act was passed before the by-law, and as such the latter will need to be read subject to the Act. The By-law incorporates the waste management hierarchy. Certain waste may also be declared as priority waste. Section 10 requires that the waste generators of the following classes of waste must submit an integrated waste management plan: (a) business waste; (b) industrial waste; building waste; (d) event waste; (e) priority waste; (f) hazardous waste; (g) those applying for special dispensation in terms of section 9; (h) those who sort waste or undertake a recycling, re-use or waste recovery activity including but not limited to

	scrap dealers, recycling groups and buy back centres; (i) any other person who is given notice to do so by the Director; or (j) those persons carrying out the activities listed in paragraph (h). An exemption from having to submit a plan may be applied for. E-waste is affected by the above list, so too are recyclers. Section 13(3) requires that *Any person who undertakes a recycling, re-use, processing, treatment or recovery activity or who sorts waste, including scrap dealers, buy back centres and formalised recycling groups, must register for accreditation with the City that will entitle them to perform such activities.* Persons and entities that handle, transport, process, treat and dispose of waste for recycling purposes must provide the waste management officer with a written report on or before the 7th of each month in a format to be determined by the director (Section 13(4). Here too an exemption from having to report can be applied for. Section 16 deals with licences and requires that *Any person who, or entity which, requires a license in terms of national, provincial or municipal legislation will have to prove on request, to the waste management officer that such person or entity has obtained the appropriate license within 30 days or such lesser period as specified by such officer.*
Water By-law, LA 18366 of 1 September 2006	Section 59 (Prevention of Pollution of Water): *(1) An owner must provide and maintain measures approved by the Director: Water to prevent the entry of a substance which may be a danger to health or adversely affect the potability of water into-* *(a) the water supply system, and* *(b) any part of the water installation on his or her premises.* (2) The Director: Water must approve the appropriate level of backflow prevention required in each instance.
Wastewater and Industrial Effluent By-law, LA 18367 of 1 September 2006	Section 3 (Protection of municipal sewers): This section sets out detailed and lengthy requirements for effluent quality. Discharge of hazardous substances from e-waste or related activities would fall under this. This would only really be relevant where effluent is actually generated and as such would probably be limited to heavier industry (eg. smelters).
Stormwater Management By-law, PG 6300 of 23 September 2005	Section 3 (Prohibited discharges): *No person may, except with the written consent of the Council and subject to any conditions it may impose, discharge, permit to enter or place anything other than stormwater into the stormwater system.* Section 4 (Protection of stormwater system): *No person may, except with the written consent of the*

Council and subject to any condition it may impose-

discharge from any place, or place onto any surface, any substance other than stormwater, where that substance could reasonably be expected to find its way into the stormwater system;

discharge, permit to enter or place anything likely to damage the stormwater system or interfere with the operation thereof or contaminate or pollute the water therein;

Section 7 (Water pollution incidents):

In the event of an incident contemplated in Section 3 or Section 4(b) and (c)-

(a) the owner of the property on which the incident took place, or is still in the process of taking place, or

(b) the person responsible for the incident, if the incident is not the result of natural causes,

shall immediately report the incident to the council, and at own cost, take all reasonable measures which, in the opinion of the Council, will contain and minimise the effects of the pollution, by undertaking cleaning up procedures, including the rehabilitation of the environment, as required by the Council.

Environmental Health By-law, LA 13333 of 30 June 2003

Section 1 (Definitions):

"objectionable material" means garden litter, rubbish, waste material, rubble, scrap metal, article or thing, disused machinery, motor cars or other vehicles, as well as the disused parts thereof, refuse from any building operations, or any refuse capable of being deposited on any land or premises, including new or used building materials not necessarily required in connection with bona fide building operations actually in progress on any land, and includes any solid, liquid or gas which is or may become a nuisance or which materially interferes with the ordinary comfort or convenience of the public.

"health nuisance" means any activity, condition, premises or thing which, on account of effluent, vapours, chemical effluvia, odours, noise, vibration, radiation, refuse, waste products, dirt, chemical or biochemical material, microbial infection, vermin, vegetation, overcrowding, lack of proper general hygiene, ventilation, lighting, design, situation or on account of any other cause or practice whatsoever, is/are in the opinion of the Director: Health Service or a duly authorised council employee potentially injurious or dangerous to health or which is/are offensive, including, without affecting the generality of the aforegoing, any facility for the storage, distribution or handling of water that is likely to be used by man for domestic purposes or consumption, including such water itself, which is contaminated or polluted.

Section 2:

…no person shall-

(7) Cause or permit any foul or polluted water or any

	foul liquid or objectionable material to run or flow from any premises to that owned or occupied by another person, whether occupied for trade, business, manufacturing, dwelling or other purposes, onto any land or into any stormwater, river or canal system. *(8) Commit, cause or permit to be committed any act which may pollute any water to which inhabitants of the area of jurisdiction of the council have the right of use or access.* These two subsections have relevance insofar as storm and groundwater pollution are concerned. Section 8: *No person shall keep, cause or suffer to be kept on any premises any accumulation or deposit of filth, rubbish, refuse, manure, other offensive matter, or objectionable material or thing so as to be a health nuisance.*
Air Pollution Control By-law, LA 12649 of 4 February 2003	Section 2 requires the avoidance of air pollution, and if that is not possible, the minimisation thereof. Section 3 imposes a duty of care on significant air polluters to prevent or mitigate such emissions. Section 19 makes it an offence to create a nuisance.
Draft Air Quality Management By-law	This draft by-law was recently published for comment and as such is not yet in force. While its provisions are fairly similar to those of the current Air Pollution Control By-law (see above) the following are worth noting in the interim: Local emission standards may be declared (section 7), so too norms and standards (section 8). Air pollution control zones may be identified in terms of section 10. Chapter V deals with fuel burning equipment (ie. burners and boilers) and requires same to be approved by the City. Chapter VII regulates dust emissions, open burning and burning of material all of which need the City's prior written permission. The burning of rubber and other material for the recovery of metal also requires the City's prior written permission (section 21). Activities which result in nuisances are not permitted (section 31). Once the List of Activities resulting in atmospheric emissions is published by the Minister in terms of section 21 of the Air Quality Act an emission licence will be required. Section 37 of the Draft By-law states that *No person shall undertake a listed activity, as published…without an atmospheric emission license.* The licence application will be processed by the City.
Johannesburg	
Waste Management By-laws, 2003	The following provisions of the City of Johannesburg's Waste Management By-laws are relevant. Section 1 (Definitions): *"hazardous waste" means waste containing, or contaminated by, poison, any corrosive agent, any flammable substance having an open flash-point of less than 90 deg C, an explosive, radioactive material, any chemical or any other waste that has the potential even in low concentrations to have a significant*

adverse effect on public health or the environment because of its inherent toxicological, chemical and physical characteristics;

"recyclable waste" means waste which has been separated from the waste stream, and set aside for purposes of recycling;

"recycling" means the use, re-use or reclamation of material so that it re-enters an industrial process rather than becoming waste;

"waste" means any undesirable or superfluous matter, material, by-product or residue of any process or activity that has been discarded, accumulated or stored for the purpose of treatment, discarding or recycling and may be liquid or solid, may include products that contain a gaseous component and may originate from domestic, commercial, medical or industrial activities, but does not include any gas

or gaseous product which may be regulated by national or Gauteng provincial legislation;

"waste handling facility" means any facility on or in which waste is accepted, accumulated, handled, recycled, sorted, stored or treated prior to its transfer for treatment by way of incineration or for final disposal;

Note the mention of recycling activities in the last two definitions. Oddly enough, despite it being defined, there is almost no mention of waste handling facilities in the By-law itself.

Section 2 (Principles):

(2) The underlying principle of these By-laws is to establish a waste management hierarchy in the following order of priority:

(a) avoidance, waste minimisation and waste reduction;

(b) re-use;

(c) recycling, reprocessing and treatment; and

(d) disposal.

Section 3 (Main objects) (extract):

(2) In pursuing the main objects of these By-laws, and in particular the object set out in subsection (1) the Council must –

(a) endeavour to minimise the consumption of natural resources;

(b) promote the re-use and recycling of waste;

(c) encourage waste separation to facilitate re-use and recycling.

Section 19 (Generation of special industrial, hazardous or health care risk waste):

(1) No person may carry on an activity which will generate special industrial, hazardous or health care risk waste, without notifying the Council in writing, prior to the generation of such waste, of the composition of such waste, the estimated quantity to be generated, the method of storage, the proposed duration of storage,

the manner in which it will be collected and disposed of, and the identity of the licensee who will remove such waste: Provided that if such waste is being generated as a result of activities which commenced prior to the commencement of these By-laws, the generator must notify the Council as contemplated in this subsection within 180 days of the commencement of these By-laws.

Section 20 (Storage of special industrial, hazardous or health care risk waste):

(1) Any person carrying on an activity which generates special industrial, hazardous or health care risk waste, must ensure that such waste generated on the premises is kept and stored thereon until it is collected from the premises.

(2) Special industrial, hazardous or health care risk waste stored on premises, must be stored in such a manner that it does not become a nuisance or causes harm to human health or damage to the environment, and in accordance with the requirements of any applicable legislation relating to buildings.

(3) Special industrial, hazardous or health care risk waste must be stored in an approved receptacle and for a period not exceeding 90 days or any other maximum period stipulated by the Department of Water and Environmental Affairs, Gauteng provincial government or Council, before collection.

Sections 21 & 22 (Collection and disposal of special industrial, hazardous or health care risk waste; Transportation of waste):

This requires that the above waste types may only be collected and disposed of by a licensee and subject to the requirements of applicable SANS codes (essentially the same as those contained in the Regulations in terms of the National Road Traffic Act – see also above at 2.11).

Section 23 (Disposal of waste):

(12) No person may store waste for more than 90 consecutive days, unless the person has a permit in respect of the premises concerned for a waste disposal facility from the Department of Water and Environmental Affairs in terms of section 20(1) of the Environment Conservation Act, 1989 (Act No. 73 of 1989).

Chapter 6 deals with licensees (ie waste transporters/disposers):

Section 24 (Licence requirements):

Subject to the provisions of section 32, no person may collect or transport any of the following waste streams listed in subsection (2) without having obtained from the Council, and being in possession of a licence authorising such collection and transportation:

	(d) hazardous waste; *(e) recyclable waste.* Section 31 of the By-law makes provision for the Council, having regard to the main objects of the By-law contemplated in section 3(1), and its local waste plan, by notice in the Gauteng Provincial Gazette, to exempt any type of *commercial service* (our emphasis) from any provision of this Chapter to the extent and subject to the terms specified in such notice.
Water Services By-laws, PN 179 of 21 May 2004	Section 43 (Owner to prevent pollution of water): *An owner must provide and maintain effective measures to prevent the entry of any substance or matter, which may be a danger to health or may adversely affect the potability of water or affect its fitness for use, in -* *(a) the water supply system or plant; and* *(b) any part of the water installation on his or her premises.* This would prohibit the pollution of water (ground, surface or stormwater) or effluent by hazardous substances found in e-waste. In terms of the By-law the owner has to prevent the pollution of water. This is a serious flaw in our opinion, as this excludes (at least under this By-law, but not under NEMA or the National Water Act) tenants or other occupiers of land. Having said that, this certainly does not mean that e-waste recyclers, handlers, smelters etc who are not the owners of the premises from which they operate, have no obligation to prevent the pollution of water. • Section 62 (Objectionable discharge to sewage disposal system):
Public Health By-law, PN 830 of 21 May 2004	This By-law has more limited application for present purposes as it deals with public health, and therefore only indirectly with environmental issues (although there is admittedly a large overlap between these two). Section 5 prohibits the causing of public health hazards, this includes the pollution of water supply for domestic consumption. Section 7 makes it unlawful to create public health nuisances; this extends to (domestic) water pollution as well. Section 36 (Pollution of sources of water supply) states that: *No person may pollute or contaminate any catchment area, river, canal, well, reservoir, filter bed, water purification or pumping works, tank, cistern or other source* *of water supply or storage in a way that creates a public health nuisance or a public health hazard.* Section 42 deals with stormwater runoff and requires the prevention of pollution thereof. E-waste collectors, recyclers etc should therefore ensure that no stormwater pollution takes place, or that no hazardous substances

	can enter the drains. Chapter 7 deals with offensive trades, and e-waste activities may potentially fall under the definition thereof as section 44 defines such trades as including, inter alia: *(b) operating a waste recycling plant including oil and petroleum product recycling;* *(c) scrap yard or scrap metal dealing.* Section 45 requires offensive traders to obtain a permit. Section 46 sets out various building and structural requirements for premises from which an offensive trade is conducted, while section 47 describes the duties of such traders (for present purposes these would be restricted to the prevention of pollution or other nuisances/hazards). Chapter 9 deals with second hand goods, and defines same as, inter alia: *any business in which used goods and materials are sold, including, without limitation –* *(a) clothing, furniture, scrapped motor vehicles, footwear, timber, building bricks or blocks, building material or fittings, machinery, drums, tins, bottles, packing cases, boxes, crates or other containers, metal, rags, plastic bags, paper or any other material, which has previously been used.* Sections 58 and 59 prescribe premise requirements as well as duties of such traders. The provisions governing the Second-Hand Goods Act, 2009, and the Draft Regulations should be kept in mind; these were discussed briefly above (at 2.18). E-waste recyclers would most likely be regarded as second-hand goods traders in terms of the by-law (as read subject to the Second-Hand Goods Act).
Durban / eThekwini Municipality	
Refuse Removal By-law, PN 47 of 2002	This By-law is vague and merely discusses various waste streams or types in general terms. There is an obligation to dispose of hazardous waste in a responsible and lawful manner, and to ensure that any waste is stored properly. There are no waste prevention, minimisation, reuse or recycling requirements and this By-law is very much end-of-pipe. The accumulation of waste, so that it constitutes a nuisance, is prohibited (section 8).
Water Supply By-law, MN 104 of 26 September 1996	Water pollution is dealt with in section VIII/1: *An owner shall at his own cost, take the necessary steps, acceptable to the authorised delegate, to prevent the entry of a substance which may be a danger to health or adversely affect the potability of water into -* *(a) the water supply system; and* *(b) any part of the water installation on his premises.*

Scheduled Trades and Occupations By-laws, PN 134 of 22 March 1979	E-waste may potentially fall under the following listed activities: • Refuse collection, storage, removal, processing or disposal • Scrap yard • Waste material salvaging, collecting, sorting, storing, treating, processing or recycling/reclaiming A permit is required to conduct an offensive trade.
Tshwane	
Solid Waste By-laws, 2005	Section 1 (Definitions): *"Hazardous waste" means waste which contains or is contaminated by poison, a corrosive agent, a flammable substance having an open flash-point of less than 100 ℃, an explosive, radioactive material, a chemical or any other substance that is classified as a hazardous substance in terms of the Hazardous Substances Act, 1973 (Act 15 of 1973), or in terms of the National Road Traffic Act, 1996 (Act 93 of 1996).* *"recycling" means the collection, selection or removal of waste for the purpose of reselling or reusing selected materials in a manufacturing or other process;* *"recyclable" means any material intended for recycling or a remanufacture process and which was never part of the waste stream at the point of removal, but was* *managed as a potential resource by the originator of such material and never contaminated with any other material.* Section 18 (Notification of generation of special industrial waste, hazardous waste or medical waste): *(1) A person or other legal entity must not, within the area of jurisdiction of the Municipality, operate or conduct a service for the removal of any type of waste contemplated in this chapter from premises, irrespective of whether such service is rendered for payment or not, unless such natural person or other legal entity is registered by the Municipality.* *(2) An authorized service provider engaged in an activity or activities which generate special industrial waste, hazardous waste or medical waste to be generated must notify the Municipality, before commencement of such generation, of -* *(a) the composition of the waste;* *(b) the quantity of the waste;* *(c) the method of storage of the waste;* *(d) the proposed duration of the storage of the waste; and* (e) *in terms of the provisions of section 20(4), the manner in which the waste will be removed.* Section 19 deals with the storage of special industrial

	waste, hazardous waste and medical waste and requires that same be stored in a responsible manner. Section 20 (Removal and disposal of special Industrial waste, hazardous waste and medical waste) requires that: *(1) A person must not, without the written consent of the Municipality and subject to such terms and conditions as the Municipality may deem fit, remove or have special industrial waste, hazardous waste or medical waste removed from the premises on which it was generated.* *(2) The occupier of premises must only have special industrial waste, hazardous waste or medical waste removed by a contractor approved by the Municipality in compliance with the relevant legislation.* Section 27 (Recycling): *(1) Recyclable material for the purpose of recycling must not be stored at any premises resulting in risks or nuisance conditions;* *(2) A person involved in any way in recycling, must comply with all applicable statutory requirements;* *(3) Separation of waste or sorting of recyclables shall be performed on the premises of the point of generation of the recyclable waste stream;* *(4) All facilities where separation and classification of recyclable material is performed, must comply with the applicable statutory requirements.* Section 32 (Permitting of private service providers by the Municipality): This section provides that any natural person or other legal entity which operates or conducts waste recycling activities of any nature or extent must be permitted by the Council, irrespective of whether such service is rendered for payment or not.
Sanitation By-laws, 2003	Section 32 (Sewage or other pollutants not to enter stormwater drains) states that leakages or spills may not enter any street, stormwater drain or other watercourse except with the written permission of Council.
Water Supply By-laws, 2003	Section 18 (Pollution of water) provides that *An owner of premises must take and maintain approved measures to prevent the entry into -* *(a) the water supply system; and* *(b) any part of the water installation on his or her premises;* *of a substance that may be harmful or a danger to the health or well-being of any human or other living organism or may adversely affect the potability of water or its fitness for use.*
Ekurhuleni	
Solid Waste By-law, PG 51 of 6 March 2002	Section 1 (Definitions):

	"hazardous waste" means waste which can, even in low concentrations, have a significant adverse effect on public health and/or the environment because of its inherent chemical and physical characteristics such as toxic, ignitable, corrosive, carcinogenic or other properties.
	Section 18 (Notification of generation of special industrial, hazardous, medical and infectious refuse): *(1) A person engaged in an activity which causes special industrial, hazardous, medical or infectious refuse to be generated, shall notify the Council within seven days of such generation of the composition thereof, the quantity generated, method of storage, the proposed duration of storage, and the manner in which it will be removed.*
	Section 19 (Storing of special, industrial, hazardous, medical and infectious refuse): *(2) Special industrial, hazardous, medical or infectious refuse stored on premises shall be stored in such manner that it cannot become a nuisance, safety hazard or pollute the environment.*
	Section 20 (Removal of special industrial hazardous, medical and infectious refuse): *(1) (a) No person may, without or not in accordance with the Council's written approval of conditions, remove special industrial, hazardous, medical and infectious refuse from a premises at which it has been generated.*
Wastewater By-laws, PN 274 of 6 March 2002	Section 33 (Sewage or other prohibited discharges not to enter storm-water drains): *(1) No owner or occupier or any other person shall discharge or cause or permit to be discharged any sewage directly or indirectly into a storm-water drain, river, stream or other watercourse, whether natural or artificial.*
	Section 37 (Prohibited discharges): This section sets out detailed and lengthy requirements for effluent quality. Discharge of hazardous substances from e-waste or related activities would fall under this.
Water Supply By-law, PN 276 of 6 March 2002	Section 43 (Pollution of surface water): *(1) No person shall -* *(e) cause or permit the water from any sink, sewer, drain, engine, boiler or any other polluted water or liquid or oil for the control of which he or she is responsible, to run or be brought into any such stream, reservoir aqueduct, or other place; or* *(f) do any other act whereby the supply of water to the*

inhabitants of the Council's area of supply may be polluted.

B. 4 **International Conventions & legislation**

- Basel Convention on the control of trans-boundary movement of waste and its disposal
- EU Directive on Waste Electrical and Electronic Equipment (known as WEEE Directive)
- EU Directive on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (known as RoHS Directive)
- Swiss Ordinance on the Return, the Taking Back and the Disposal of Electrical and Electronic Equipment (ORDEE), 1998

B. 5 Non-disclosure/destruction of software and data on data carriers must be insured.

B..6 Companies based outside of South Africa must uphold the legal regulations applicable in that country, unless these are significantly less stringent, in which case the South African Guidelines will apply.

B.2 Burden of proof

B.2.1 The recycling company must always be in a position to prove to the Technical Control Committee that all legal regulations have been met. Although legal compliance is not part of the audit process, eWASA reserves the right to request an extensive legal compliance audit.

B.2.2 Acceptable proof consists of a company-specific relevance assessment of all legal requirements, as well as registration of all documents, records, memos, approvals, provisions and contact between the company and the national, provincial and local government enforcement authorities, as well as with inspectors and auditors.

C. General rules on treatment

C.1 Data carriers

C.1.1 Any software and data still existing on data carriers may not be extracted from the data carrier, reused or used elsewhere.

C.1.2 Data carriers must be treated at the recycling company in such a way that any remaining data is made unreadable through the reworking/destruction of material (e.g. shredding or burning of data carriers). Treatment processes in which the data could be read again later are not permitted.

C.2 Disassembling and mechanical processing

C.2.1 The preparatory processes must focus on optimum recovery of recyclable fractions and the proper separation for downstream treatment of hazardous substances.

C.2.2 The staff at the recycling company must be appropriately trained and instructed so that they can identify and assess contaminant-containing appliances and hazardous waste, and be able to identify their threat potential, at all times.

C.2.3 Hazardous substances mentioned in Section D must be removed from the appliances and treated according to the standards defined therein.

C.2.4 When removing hazardous substances, a coordinated process must be followed to ensure that that hazardous waste does not contaminate other fractions. .

C.2.5 Waste electrical and electronic appliances may not be processed mechanically with scrap metal or other waste. Exceptions are only granted by the eWASA under special conditions and any particular measures that are required by eWASA will be issued in writing and must implemented.

C.3 Co-mingling and Dilution ban

C.3.1 Hazardous waste may not be mixed in with other fractions during the preparatory processes if this primarily serves to dilute the hazardous waste content of the waste fractions so as to comply with regulations on release, recovery or storage.

C.3.2 Separated components must be treated in such a way that the hazardous components recovered are concentrated are for the purpose of destruction, recovery or final disposal, and so that they are separated from recyclable parts not containing hazardous waste. The same also applies to contaminant-containing residues from filter systems, air classifiers and other preparatory systems.

C.3.3 Equipment not completely rid of hazardous waste may not be mixed with other waste for further treatment, or be released to external companies which are not recycling partners of eWASA.

C.4 Disposal of unusable fractions

C.4.1 All substances which cannot be recovered must be disposed of according to the Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste with the relevant SANS Code 10228 Class.

C.4.2 All residues or wastes for disposal must be disposed of at a correctly licensed disposal facility, and proof of such disposal must be retained.

D. Decontamination

D.1 Batteries

D.1.1 Batteries must be removed from the appliances or other components and classified, and then processed using best practicable environmental option.

D.1.2 The Regulations on Transportation of Dangerous Goods and Substances in terms of the National Road Traffic Act (GNR 225 of 17th March 2000) and the Hazardous Substance Act 15 of 1973 must be observed for the collection and transport of batteries.

D.2 Capacitors

D.2.1 Capacitors greater than height > 25 mm, diameter > 25 mm or similar volumes must be removed from the appliances or other components, and then processed using best practicable environmental option.

D.2.2 The Regulations on Transportation of Dangerous Goods and Substances in terms of the National Road Traffic Act (GNR 225 of 17th March 2000) and the Hazardous Substance Act 15 of 1973 must be observed for the collection and transport of capacitors.

D.2.3 Capacitors that have been removed from appliances may not be damaged in the process, and must be stored in such a manner as to prevent ingress of water to the storage compartment and the escape of leachate there from.

D.3 Plastics

D.3.1 Separated plastics from waste electrical and electronic appliances must be used in material recycling or appropriately processed using best practicable environmental option.

D.3.2 If the separated plastics contain hazardous substances they must be classified as hazardous waste as per Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste with the relevant SANS Code 10228 Class.

D.3.3 If a company can prove, through appropriate analyses, that the separated plastics are not classified as hazardous waste according to the legal regulations, material recycling is permitted.

D.4 Asbestos

D.4.1 Asbestos-containing electrical appliances must be separated from other equipment, and asbestos emissions from such appliances must be prevented appropriately. The appliances must be disposed of separately as per Minimum Requirements for Handling, Classification And Disposal Of Hazardous Waste with the relevant SANS 10228 Class, and adhering to the relevant safety measures for asbestos treatment and handling as per the regulations governing the handling of asbestos of in the Occupational Health and Safety Act. Asbestos Regulations and the Regulation for the Prohibition of the Use, Manufacturing, Import and Export of Asbestos Containing Materials in terms of the Environment Conservation Act..

D.5 Radioactive components

D.5.1 The recycling companies must have an appropriate procedure for the identification of potentially radioactive appliances and components.

D.5.2 Any potentially radioactive appliances or component must be isolated from the other materials and sent back to the supplier for appropriate disposal.

D.5.3 The contracted dismantling companies must be informed of any risks by the recycling companies, and suitable precautionary measures must be taken.

D.6 Mercury-containing components

D.6.1 Mercury containing components must be sent to an appropriately permitted facility for mercury recovery where possible. Alternatively the components must be disposed of separately as per Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste with the relevant SANS 10228 Class and adhering to the relevant safety measures for mercury treatment and handling

D.6.2 Separate Guidelines (see Directives 2 and 3) apply to LCD background lighting and lamps.

E. Storage, handling and transport

E.1 Storage

E.1.1 Complete appliances, component parts, and contaminant-containing factions must be stored in such a way that unauthorised persons do not have access, particularly outside operating hours.

E.1.2 The legal obligations apply to the maximum stock of all appliances, but no more than 20% of the average annual turnover should be stored on site at any one time. The Minimum Requirements for waste handling, storage and transportations of hazardous waste are summarised in the table below

Subject	Minimum Requirement
Qualification as disposal site	If a waste is held at a storage site for a period exceeding three months, the site automatically qualifies as a Waste Disposal Site, and must be

	registered as such and meet all the requirements of a disposal site.
Temporary storage area	A temporary storage area must have a firm, waterproof base and drainage system. It must be so designed and managed that there is no escape of contaminants into the environment.
Identification of waste	The transporter must be provided with accurate information about the nature and properties of the load.
Documentation	The transport operator must be provided with the relevant transportation documentation for the consignment.
Security of load	The load must be properly loaded and secured on site.
Hazchem placard	The transport operator must be supplied with the appropriate Hazchem placards.
Hazchem placard	The transport operator must ensure that the Hazchem placards are properly fitted to the vehicle.
Vehicle Roadworthiness	The Responsible Person must ensure that before the vehicle leaves the consignor's premises it is not overloaded or showing any obvious defect that would affect its safety.
Escape of hazardous spillage at site	The Department, Local Authorities, and the Competent Authority must be advised immediately, should it prove impossible to contain spillage of a Hazardous Waste on a site.
Protection against effect of accident	The Generator - or his representative, i.e., transporter - must ensure that adequate steps are taken to minimise the effect an accident or incident may have on the public and on the environment.
Spillage on site	The Generator must initiate remedial action to clean up any spillage remaining on a site after an accident.
Notification	All road accidents must be reported to the Department of Transport on the prescribed documentation.
Notification	In case of an accident, a full report, containing all the information listed in 10.8.2 must be sent to the Local Authorities, the Competent Authority and the Department

E.1.3 Temporarily higher stock must be reported to the appropriate authorities provincial Environmental Department.

E.1.4 Contaminant-free appliances and pure scrap fractions made from metal, plastic, glass or wood which do not contain hazardous substances may be stored outdoors without weatherproofing, insofar as run-off from the storage site is contained and, if compliant with the municipal effluent by-laws, released to the municipal sewer.

E.1.5 Any appliance, component, or fraction that contains hazardous substances must be stored under cover on an impermeable floor as required by the Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste. rain appropriate authorities

E.1.6 Effluent limit values in the local municipality by-laws and Department of Water Affairs and Environment standards must be complied with at all times.

E.1.7 Compact fluorescent lamps (CFLs) and fluorescent tubes must be stored separately in a shatter-proof manner.

E.1.9 Glass breakage from CFLs and fluorescent tubes must be stored in a closed container to minimise the release of mercury.

E.2 Handling

E.2.1 Containers with mixed goods (small electrical appliances, as well as consumer electronics and information technology equipment) must be handled in such a way that no screens are damaged.

E.2.2 Refrigeration, freezing, air-conditioning and other compressor appliances, old washing machines, cooking stoves, heating appliances, sun beds and lamps must be handled particularly cautiously and with suitable equipment. (refer to relevant directive)

E.2.3 The recycling company must take all reasonable measures to ensure that CFLs and fluorescent tubes are delivered to it undamaged. CFLs and fluorescent tubes must be collected separately from incandescent lamps, packaging material and protective casing.

E.3 Transport

E.3.1 The regulations on Transportation of Dangerous Goods and Substances transportation of dangerous goods and substances of the regulation in terms of the National Road Traffic Act national road traffic act (GNR 225 of 17th March 2000) and the Hazardous Substance Act hazardous substance act 15 of 1973 must be observed for the transport of hazardous waste.

E.3.2 CFLs and fluorescent tubes must be transported in such a way that they cannot be damaged or broken, preferably in specially designed containers.

E.3.3 all goods being transported must be adequately secured on the vehicle so as to prevent the spillage of any materials during the transportation of the goods.

F. Documentation and recording duties

F.1 Company organisation and responsibility

F.1.1 The recycling company must have an organisation chart which clearly shows the responsibilities and names of the responsible persons in the areas of safety and the environment.

F.1.2 The recycling company must provide and document the relevant internal and external training of staff.

F.1.3 The recycling company must have a documented management system detailing the internal controls, measures for improving processes, the disposal standards, as well as recording particular operational incidents such as occupational accidents, spillages, leakages, fires and damage from natural phenomena as required by their Waste License

F.2 Work instructions and flow charts

F.2.1 Written instructions stating the significance and appearance of the relevant contaminants and other particular threats (e.g. risk of injury) must be available for all work stages. The instructions for manual disassembling and pre-treatment according to equipment types, as well as the flow charts for the mechanical preparation processes, must be clearly documented.

F.2.2 The internal administrative processes concerning the disposal of the electronic and electrical equipment must be documented and provided to the TCC on request.

F.3 Materials accounting

F.3.1 The recycling company commits to keeping account of all material flows using the recording and analysis templates provided by eWASA. The consolidated data is to be provided to the TCC during the bi-annual audit or whenever this is requested by eWASA.

FF.3.2 All incoming and outgoing deliveries of appliances and fractions must be recorded and documented using goods manifests, weight certificates, delivery notes, data sheets or TREM cards, as required by the Waste License. This information must supplied to the relevant authority as required by the Waste Information System Regulations under the NEMWA, once promulgated.

F.3.3 The materials accounting is used by the TCC to prepare factory checks, assess the recycling system as a whole, balance the material flows through all plants, and assess the key figures for individual plants.

F.4 Proof of material flows

F.4.1 The recycling company is responsible for the entire treatment chain, from receipt of the equipment to the final disposal process/start of the recovery process.

F.4.2 The recycling company commits to obtaining and retaining proof of material flow from the recipient for fractions produced through external processing. Proof of material flow for a forwarded fraction shall contain the name and address of the recipient, the type of further treatment, and information on the fractions produced and the forwarding of these.

F.4.3 Proof of material flow can be sent directly to eWASA by the recipient insofar as no information on the type of further treatment or produced fractions is to be sent to the recycling company for operational reasons.

F.5 Monitoring and checking of the quality of decontamination

F.5.1 The quality of decontamination in mechanical processing must be checked at least once a year with the help of chemical analyses of the light-weight fractions. A representative collected mixed sample must be taken. The sampling plan must be approved by the TCC. The analysis process must comply with the standard of technology, and be performed by accredited laboratories.

F.5.2 To assess the quality of decontamination through chemical analyses, the following reference values are used:

- Copper Cu 10,000 mg/kg (1.0%)
- Cadmium Cd 1,000 mg/kg (0.1%)
- PCB 50 mg/kg

F.5.3 If one or more reference limits are exceeded in a representative examination, suitable remedial measures must be taken immediately to ensure the reference values are achievedlimits.

F.5.4 If the copper content in the light-weight fraction totals more than 4%, the copper must be recovered in a suitable process. For a copper percentage of between 1% and 4%, the TCC will decide on any measures depending on ecological and economic criteria.

PART II DIRECTIVES

Accepted recycling, and recovery technologies

6.1 In general, the requirements for the defined maximum quantities of hazardous substances and/or impurities must be met in all recovery and disposal options or technologies.

6.2 The recycling technologies listed in the table below are according to the Hazardous Waste Classification tables in Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, second edition, 1998 and the agreed technologies in the WEEE Forum

Fraction	Final process/technology	WEEE Forum[2] (WF_RepTool)	eWASA		
			Preferred technology	Allowed technology	Not allowed technology
Iron/stainless steel	Melting down in the steelworks	MR	MR		
	Reducing agent in the copper smelting furnace	MR	MR		
Copper	Copper smelting furnace	MR	MR		
	Alloying components for aluminium alloys in the smelting plant	MR	MR		
Aluminium	Aluminium smelting plant	MR	RCY	IML ENC	PR N LW T
	Reducing agent in the copper smelting plant	MR	MR		
	Reducing agent in the steel works	MR	MR		
Mercury	Distillation and recycling	MR	RCY	IML ENC	OC R LW T
	Immobilisation and dumping	LD	LD		
Other metals	Alloying elements e.g. in copper smelting furnaces	MR	MR		
	Slag formers with subsequent material usage of the slag	MR	MR		
	Slag formers and subsequent dumping of the slag	TD	TD		
Plastics/ organic fractions	Preparation and regranulation	MR	MR		
	Synthesis gas production through depolymerisation	MR (1)	MR (1)		
	Pyrolysis to manufacture fuel substitute	ER (1)	ER (1)		
	Reducing agent in the copper smelting plant or steelworks	MR (1)	MR (1)		

[2] WEEE Forum WG Reporting System, Model Classification (9.6.2006)

Fraction	Final process/technology	WEEE Forum[2] (WF_RepTool)	eWASA		
			Preferred technology	Allowed technology	Not allowed technology
	Fuel substitute in the cement furnace or other industrial energy production plants	ER	ER		
PURE foam from refrigeration appliance recycling	Oil binders	MR	MR		
	Fuel in cement furnaces or other industrial energy production plants	ER	ER		
Wood and wood materials	Particle board and MDF production	MR	MR		
	Fuel in cement furnaces or other industrial energy production plants, matured timber incineration plants	ER	ER		
Paper/ cardboard	Paper or cardboard manufacturing	MR	MR		
	Fuel substitute in the cement furnace or other industrial energy production plants	ER	ER		
	Refuse and hazardous waste incineration plant	TD			
Oil fraction	Decontamination and refining into new technical oil	MR	MR		
	Fuel substitute in the cement furnace or other industrial energy production plants	ER	ER		
	Refuse and hazardous waste incineration plant	TD			
(H)(C)FC	Chemical separation for using chemical raw materials	MR	MR		
	Fuel substitute in the cement furnace or other industrial energy production plants	ER	ER		
	Hazardous waste incineration plant	TD	TD		
Cathode ray tube glass (mixed or separated)	Cathode ray tube glass production	MR	MR		
	Slag formation material in copper or lead works	MR	MR (2)		
	Raw material in the ceramics industry	MR	MR		LWT
	Raw material in the cement industry		MR		LWT
	Mine packing material (filling of underground caverns)	LD	LD		LWT
	Landfilling in H:H permitted site			ENC, INL	LWT

Fraction	Final process/technology	WEEE Forum[2] (WF_RepTool)	eWASA		
			Preferred technology	Allowed technology	Not allowed technology
Cathode ray tube faceplate	Raw material for glass wool, foam glass and other forms of glass production	MR	MR		
	Raw material for coatings and fillers in civil engineering	MR	MR		
Flat glass	Raw material for glass wool, foam glass and other forms of glass production	MR	MR		
Glass from gas discharge lamps	Raw material for gas discharge lamps	MR	MR		
	Slag formation material in copper or lead works	MR	MR (2)		
	Raw material in the ceramics industry	MR	MR		
	Raw material in the cement industry		MR		
	Mine packing material (filling of underground caverns)	LD	LD		
	Raw material for glass wool, foam glass and other forms of glass production	MR	MR		
	Raw material for coatings and fillers in civil engineering	MR	MR		
Toner cartridges	Cleaning, repairing and refilling	RU	RCY		
	Material recycling	MR	MR		
	Hazardous waste incineration plant	TD	TD		
	Landfilling in H:H permitted site			ENC, INL	LWT

Abbreviations for classifying the recycling technologies:

MR: Material Recycling

ER: Energy Recovery

ENC: Encapsulation - The containment of waste in drums or other approved containers in a reinforced concrete cell within a permitted hazardous waste landfill. Encapsulation of organic materials is permitted only in the absence of an appropriate and cost effective incineration facility.

IML: Immobilisation then landfill - This term includes all immobilisation techniques such as microencapsulation, vitrification and solidification but not macroencapsulation.

TD: Thermal Disposal; this classification also applies to all non-combustible materials which arrive at an incineration plant.

LD: Landfill Disposal

LWT: Landfilling without treatment - Landfilling of the waste is not allowed without appropriate pretreatment.

OCR: Oxidation then landfill co-dispose residues - Oxidise, e.g. by using chlorine or another oxidising agent, prior to co-disposal to landfill.

PRN: Precipitation then landfill co-dispose residues - Addition of lime, sodium sulphide or other reagent that results in the formation of insoluble compounds that come out of solution. Usually the solids are separated from the liquids prior to co-disposal to landfill.

RCY: Recovery - This term includes all recycling, reuse and utilisation techniques.

RU: Re-use, without destruction of the original function

The numbers (1), (2), (3) and (4) after the abbreviations mean the following:

(1) Interim classification
(2) Only applies if the slag is used for material recycling, otherwise LD
(3) For a refuse or waste incineration plant to be acknowledged as energy recovery, the criteria of the recognised European models for proving the recovery status of thermal systems must be met.[3] The necessary documents must be provided to the controlling board by the recycling company.
(4) Not permitted.

'WEEE-Forum' (WF_RepTool) column:
To facilitate comparability with the European harmonisation efforts, the terminology and classification applied as part of the WEEE Forum is used.

7.5 Flow charts for the manual dismantling of fractions

Planning	**Information**
- Define the quantity, duration, appliance category, fractions and method of collection - Discuss the plan with control experts	- Min. 2 weight % of the annual quantity or 1 week, if all dismantling work stations are involved - Extent of dismantling and fractions must be maintained just as they routinely take place

Preparation	**Information**
- Organisation	- Instruct staff etc. - Advise deadline
- Collect equipment	- Plan enough time - Wet and un-emptied equipment can cause balance differences
- Record equipment	- Weigh - Describe condition (wet/dry), photographic documentation - Possibly use hand counters to count large equipment

[3] These are set by the Confederation of European Waste-to-Energy Plants (CEWEP). The Verband der Betreiber Schweizerischer Abfallverwertungsanlagen (VBSA) is a member of the CEWEP. Is this relevant.

- Weigh fractions	- Define the weight recording process for container change - The reliability of the weight recording for container changes must be ensured - Document fractions with photos - Document proof from external processors

DIRECTIVE 2: ICT AND Consumer Electronics

LCDs

1.1 Cold cathode fluorescent lamps in LCDs greater than 100 cm² must be removed and recycled or disposed of appropriately.

1.2 It is possible to process LCDs without prior removal of the cold cathode fluorescent lamps, after discussion with the controlling boards, insofar as it is ensured that no hazardous substances contained in the cold cathode fluorescent lamps, particularly mercury, have been distributed over the fractions produced in the process, and that the hazardous substances have been recycled or disposed of appropriately.

1.3 When decontaminating and processing LCDs, the emissions of hazardous substances – particularly mercury – must be kept within prescribed thresholds, to ensure that the environment and the health of the staff are not adversely affected.

Cathode ray tubes

2.1 Cathode ray tubes must be ventilated prior to manual or mechanical processing (implosion risk).

2.2 The luminescent coating, as well as the “getters”, must be removed in accordance with the applicable occupational safety regulations and then recycled or disposed of appropriately.

2.3 Screen glass must, where possible, be recycled in cathode ray tube manufacturing.

2.4 If it is proven that no material recycling is possible in the cathode ray tube manufacturing process, recycling of screen, cone or mixed glass in the ceramics industry, smelting works or other suitable recycling processes (e.g. special glass manufacturing) is permitted. In doing so, harmful substances (e.g. lead) must not be used in applications where they are not technically necessary. The controlling boards must be informed of the disposal route.

Printers and copiers

3.1 Photoconductor drums with selenium arsenide or cadmium sulphide coating, as well as toner cartridges, must be removed in accordance with the applicable occupational safety regulations and be recycled or disposed of appropriately.

3.2 When handling toner cartridges, attention must be paid to the risk of dust explosions.

Hard drives

3.1 Hard drives sent for recycling must be destroyed and safe destruction certificates issued. If you pass hard drives onto another recycler ensure that they cannot be recovered for function.

DIRECTIVE 3: COMPACT FLUORESENT LAMPS

Scope and definitions

1.1 These Guidelines specify, in accordance with the WEEE Directive[1] and the DTI Recycling & Disposal Implementation Guideline, which specifies the minimum requirements for recycling as well as the contaminant recovery details for lamps.

1.2 The regulations apply for all gas discharge lamps classified as hazardous waste according to Minimum Requirements minimum requirements for Handling, Classification handling, classification and Disposal of Hazardous Waste and SANS 1Code 0228 "The Identification and Classification of Dangerous Substances and Goods" .

1.3 The following types are distinguished:

Straight lamps	FL: Tubular fluorescent lamps
Curved lamps	CFL-nI: Energy-saving lamps without integrated ballast
	CFL-I: Energy-saving lamps with integrated ballast
	HID: High intensity/pressure discharge lamps (mercury, halogen metal and sodium vapour discharge lamps), as well as low-pressure sodium vapour discharge lamps
	LED lamps (light-emitting diodes)

Recycling companies which dispose of lamps must have the technical and organisational qualifications to treat lamps so that the contaminant-containing luminescent coating can be recovered as completely as possible, and the lamp components can be re-used or recycled as far as possible.

Decontamination and recycling

2.1 Working steps and plants for the treatment of lamps must be organised in such a way that the emissions of mercury in the form of gas or dust or other hazardous substances from the coating material are kept as low as possible.

2.2 Plants must be equipped with suitable backup systems and operated in such a way that functional efficiency can be constantly verified.

2.3 Recycling companies must have industrial vacuum cleaners with functional activated carbon filters, as well as lockable containers for mercury-containing fractions and lamp breakages.

[1] Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)

Monitoring and controls

3.1 The air emissions from production sites and plants must be continuously monitored so that increased emissions from malfunctions or technical defects can be identified at all times.

3.2 Emissions at critical work stations must be regularly checked according to the results and exposure limits specified by the Occupational Health and Safety Act, 85 of 1993,. In addition, staff at work stations, exposed to contaminants must undergo a medical examination for mercury ingestion and exposure at least once a year. Staff working at exposed work stations for short periods of time (I.E. non permanent workers), must be screened for mercury exposure or ingestion when they are transferred to other activities on a permanent basis.

3.3 Calibration of measurement equipment and maintenance of emission appliances must be performed according to the recommendations of the system suppliers. Emission appliances must comply with applicable air quality standards.

3.4 The residual mercury content (total Hg) of fractions after treatment (e.g. recycling or incineration cf. point 2.4) which may constitute a diffuse emission source must undergo a chemical analysis at least once a year on the basis of a representative collective mixed sample.

DIRECTIVE 4: REFRIGERATION APPLIANCES

Scope and definitions

1.1 These requirements apply to recycling companies which process appliances with substances which are harmful to the ozone layer and climate, such as refrigeration, freezing, air-conditioning and other compressed gas appliances.

1.2 Appliance groups

Group A: Appliances with substances which are harmful to the ozone layer and climate, such as CFCs, PFCs, HFCs and HCFCs (e.g. R11, R12, R22, R502, R134a)
(hereinafter simplified to **CFC appliances)**

Group B: **Absorbing appliances** (NH_3)

Group C: Equipment with hydrocarbons (e.g. isobutane, cyclopentane)
(hereinafter simplified to **HC appliances)**

1.3 Equipment categories

Cat. 1 to 5 up to the dimensions: Height+Width+Depth ≤ 420 cm

Cat. 1: Simple appliances (up to 180 l),

Cat. 2: Combined refrigeration and freezing appliances (180 to 350 l)

Cat. 3: Deep-freeze appliances

Cat. 4: Commercial refrigeration appliances (solid construction) weight 80 to 140 kg

Cat. 5: Commercial refrigeration appliances (solid construction) weight 140 to 200 kg and chrome steel refrigeration appliances up to 200 kg

Cat. 6 and 7:

Cat. 6: Industrial and commercial appliances (Height+Width+Depth ≥ 420 cm) and air-conditioning appliances

Cat. 7: Boilers

Principles

2.1 Objective

The aim of these requirements is:

- to separate the appliances into fractions for material recycling as well as to retain substances which are harmful to the ozone layer and climate to ensure these are destroyed.
  to destroy substances which are harmful to the ozone layer and climate, in accordance with the Atmospheric Pollution Prevention Act, 45 of 1965 and Air Quality Act, 39 of 2004 .

2.2 Duty of care

2.2.1 The recycling company must ensure that refrigeration, freezing, air-conditioning and other compressor appliances which contain substances harmful to the ozone layer and climate are supplied to it undamaged.

2.2.2 It must then inform its suppliers that sorting of different appliance types is not permitted at the collection points.

2.2.3 All plants that handle appliances must be protected against explosions, and the company must follow the instructions for fire and explosion safety.

2.2.4 Prior to performing the processing in step 2, mercury switches and PCB-containing capacitors must be dismantled in such a manner as removed and treated according to ensure that they are not damaged the relevant regulations.

2.3 Treatment stages

2.3.1 The specialised recycling companies record the number of appliances in point 1.3 according to the size categories 1 to 7.

2.3.2 The treatment and destruction of substances which are harmful to the ozone layer and climate are divided into ‘coolants’ in stage 1 and ‘insulating materials’ in stage 2.

Requirements for the treatment and quality of end fractions

3.1 Group A: CFC equipment

Stage 1: ‘Coolants’

3.1.1 All liquids must be removed.

3.1.2 CFCs must be separated from the oil.

3.1.3 The quantity of removed CFCs must be greater than or equal to 90% of the expected quantity. The necessary plant tests must be conducted according to this directive.

3.1.4 All removed substances which are stable in air must be demonstrably destroyed through a thermal or chemical process. Delivery certificates, invoices, etc. from the relevant plant operators are considered proof.

3.1.5 Compressor oil with less than 0.2% halogen content can be used for material recycling or for energy recovery in conventional combustion plants (unless otherwise directed by the authorities).

3.1.6 Compressor oil with more than 0.2% halogen content must be combusted in suitable plants with safe destruction of the CFCs.

3.1.7 Compressors must not be recycled.

Stage 2: ‘Insulating material’

3.1.8 The quantity of recovered CFCs must be greater than or equal to 90% of the expected quantity. The necessary plant tests must be conducted according to this directive.

3.1.9 All recovered substances which are stable in air must be demonstrably destroyed through a thermal or chemical process. Delivery certificates, invoices, etc. from the relevant plant operators are considered proof.

3.1.10 Polyurethane (PU) fractions from plants must not contain more than 0.2% CFCs in the PU percentage.

3.1.11 It must be ensured that the residual polyurethane percentage in the metal and plastic fractions pending recovery is completely minimised to prevent CFC losses. Maximum residual percentages of 0.3% weight % polyurethane in the metal fractions and 0.5% polyurethane in the plastic fractions must be upheld as limit values after performing all treatment steps.

3.2 Group B: Absorbing appliances

Stage 1 'Coolants'

3.2.1 No degree of recovery for ammonia is specified for absorbing appliances.

3.2.2 Where if the refrigeration cycle has not been purged of chromate, the iron sections of the refrigeration cycle must be sent directly to the smelting plant without prior treatment due to their residual chromate content.

3.2.3 Disposal of any other fraction (water, NH_3) must take into account the chromate content.

Stage 2 'Insulating material'

3.2.4 Absorbing appliance insulating materials which are harmful to the ozone layer and climate must be removed according to the requirements in point 3.1.8 et seq.

3.3 Group C: HC appliances

Stage 1 'Coolants'

3.3.1 The coolant mixture (HC and oil) must be removed.

3.3.2 HC must be separated from the oil.

3.3.3 The HC emissions must not exceed the limit values stated in the *Atmospheric Pollution Prevention Act, 45 of 1965 and Air Quality Act, 39 of 2004*

3.3.4 Plant safety must be confirmed by the relevant specialist departments.

Stage 2 'Insulating material'

3.3.5 The HC emissions must not exceed the limit values stated in the *Atmospheric Pollution Prevention Act, 45 of 1965 and Air Quality Act, 39 of 2004*

(LRV). Observance of the legal regulations must be proven.

3.3.6 Simultaneous loading of plants with HCs and CFCs must not lead to a reduction in the recovery or destruction of the CFCs.

3.3.7 Plant safety must be ensured by the relevant specialist departments.

3.4 Treatment of CFC-containing boilers

3.4.1 To recover and destroy substances which are harmful to the ozone layer and climate resulting from the boilers' PU insulation foam, the plants employed to treat the appliances (Cat. 1 to 7) must be used, and the relevant requirements met.

Duties of documentation and record-keeping

4.1 In addition to the conventional documentation, the recycling partners must keep separate monthly records of all incoming air-conditioning and compressor appliances, and refrigeration appliances based on types and categories according to stages 1 and 2.

4.2 The following key figures must be re-collected each year and recorded:

- Residual CFC content in the PU fraction
- Residual content of organically bound halogens in the oil fraction
- Residual content of PU proportions in metal and plastic fractions

Monitoring and controls

5.1 eWASA will assess the following aspects in an on-site check:

- Annual material flow dossier
- Conditions for meeting the requirements
- Environmental law conformity for each sample (approvals, storage plants, etc.)

5.2 Performance test and acceptance of the plants by the controlling board

5.2.1 The controlling board will conduct separate performance tests for the acceptance of plants for final treatment of refrigeration appliances with CFC-containing household refrigeration appliances according to stage 1 and stage 2.

5.2.2 The performance test for initial acceptance must take place within three months:

- after the recycling company has signed the disposal contract
- after installation and start-up of a new, relocated or significantly modified plant.

5.2.3 The initial acceptance must again be renewed within three months by means of a performance test after one year. All other certifications must each be renewed after two more years.

5.2.4 If certification cannot be successfully completed, no more CFC-containing appliances can be processed, except for trial purposes.

5.2.5 If the required performances are not met, the controlling board must be informed immediately.

Methodology for determining the effectiveness of refrigeration appliance disposal plants

Material flow dossier for refrigeration, air-conditioning and freezer appliance disposal

7.1 Number, group and category of appliance in stage 1, divided according to intact and defective/empty appliances

- CFC/HCFC/HFC appliances (R12, R22)
- HFC (R134a) appliances
- HC (R600a) appliances
- NH_3 appliances
- Other appliances not to be treated in stage 1 (gas systems, not containing CFCs/HCFCs)
- Industrial appliances

7.2 Number of appliances in stage 2

- CFC/HCFC appliances (R11/12/141b)
- HC (Cyclopentane)
- Other (glass wool, polystyrene)

7.3 Fractions from stage 1

- CFC/HFC/HCFC/HC (if in the same tank, except for NH_3)
- CFC/HFC/HCFC (if in the same tank, except for NH_3 and HC)
- CFC (R12 and other CFCs)
- HFC (R134a and other HFCs)
- HCFC (R22 and other HCFCs)
- HC (R600a)
- NH_3 (NH_3-CrO_4)
- Oil
- Other materials such as glass, wood, cables, plastic parts, compressors, capacitors, Hg switches, etc.

7.4 Fractions from stage 2

- CFC/HCFC/HC (if in the same tank)
- CFC11 (if in the same tank, except for HCFC, HC)
- HC
- PU
- Ferrous metal
- Non-ferrous metal
- Plastic fraction
- Other residual material for the waste incineration plant

7.5 Documents

- Proof of disposal of all harmful substances (invoices, delivery certificates)
- Analysis certificate for residual CFC content in the PU fraction
- Analysis certificate for residual halogen content in the oil
- Proof of material flow (where required)

Methodology for determining the efficiency of stage I plants

8.1 Based on a plant input of at least 100 intact appliances from categories 1-3 (each with a compressor and refrigeration cycle and legible name plates), each refrigeration appliance is weighed, the refrigeration cycle completely emptied, and then weighed again. The containers provided to collect the CFCs and oil are empty prior to commencing work, and weighed once filled after work is complete. During the entire trial, observations must be annotated with visible CFC and oil losses, and water and parts losses which affect the mass balance. Defective appliances, i.e. appliances without CFCs, which were not separated in advance, must also be recorded.

8.2 The following recordings are available after the trial:

- Total weight of CFC (A) in kg
- Total weight of oil (B) in kg
- Total weight of the CFC quantity as per the name plate data (C)
- Decrease in total weight (D) of all extracted equipment in kg
- Number of defective appliances or appliances with losses affecting the mass balance. The comparison of the actual weight reduction of each appliance with the expected weight reduction (CFC and oil) can be used to interpret and classify defective appliances.

8.3 The following results are determined, taking into account the number of defective appliances or other observations.

8.3.1 Mass balance

The ratio of (A + B) to (D) is a benchmark for the total plant performance in terms of recovery.
Results greater than 0.97 are considered tolerable values.

8.3.2 CFC recovery

1. The ratio of (A) to (C) is a benchmark for plant performance in terms of CFC recovery.
2. The ratio of (A) to (D – B) is a benchmark for plant performance in terms of CFC recovery.

Both results (1 and 2) must not exceed 0.9.

8.3.3 CFC quantity per appliance

The ratio (A) to the number of intact appliances provides the quantity of CFCs per refrigeration appliance.
≥115 g CFC per appliance is a reference value.

8.3.4 Quantity of oil per appliance

The ratio (B) to the number of oil-containing appliances is provided by the quantity of oil per refrigeration appliance.
≥240 g oil per appliance is a reference value.

8.3.5 Percentage of defective appliances

If the percentage of defective appliances is greater than 20%, the reasons for this must be reported to the controlling board so that relevant measures can be taken.

Methodology for determining the effectiveness of stage II plants

9.1 To determine whether the quantity of recovered CFCs is equal to or greater than 90% of the expected quantity, the following procedure is applied (basis: 1000 appliances from categories 1-3 with CFC-containing PU foam):

- These are prepared based on a plant input of 1000 appliances (weighed individually or collectively).
- The containers provided to collect the CFCs are empty prior to commencing the work, and are weighed once filled after work is completed. The weighing result in kg of CFCs (without water and any cyclopentane from unidentified CF equipment!!!) is divided by the number of CFC-containing appliances. A CFC quantity in grams per appliance is recorded as the result (value = A).

9.2 The following benchmark figures must be met when recovering CFCs, depending on equipment category:

- Equipment cat. 1: 240 g per appliance
- Equipment cat. 2: 320 g per appliance
- Equipment cat. 3: 400 g per appliance

(whereby only cat. 3 appliances with < 500 L are used for the test).

Based on the equipment mix actually available at the test, the expected CFC recovery quantity (M) is calculated according to the following formula:

M $g/_{appliance}$ = (X% appliance cat. 1 x 240 $g/_{appliance}$) + (Y% appliance cat. 2 x 320 $g/_{appliance}$) + (Z% appliance cat. 3 x 400 $g/_{appliance}$)

9.3 Furthermore, the quantity of PU fraction (P) produced is determined in kg.

a. The percentage of foreign substances in the recovered PU fraction is determined in kg using a suitable calculation method **(a)**.

b. The analysis value for the residual CFC content (in kg) in the PU matrix is marked b.

c. The quantity of pure PU fractions (PU fractions minus the foreign substance percentage quantity minus CFC matrix content still contained) is calculated in kg.

(P-a-b) = result = c kg PU.

d. The PU quantity calculated in c. corresponds to 91.5% of the original material (91.5% PU / 8.5% CFC). The quantity of original loading of CFCs in the PU produced as an output fraction is thus calculated with the formula ((c x 100/91.5) – c)).

Result = d kg CFC[5]

e. All PU loss streams and the CFC losses accounted for by this are determined and evaluated (residual PU adhesions to Fe metals, non-ferrous metals, plastics and other output materials).

[5] Results of analyses which render the expected quantity more plausible if it differs from 8.5% must be provided to the controlling board prior to publication for a final evaluation.

Result = e kg CFC/HCFC

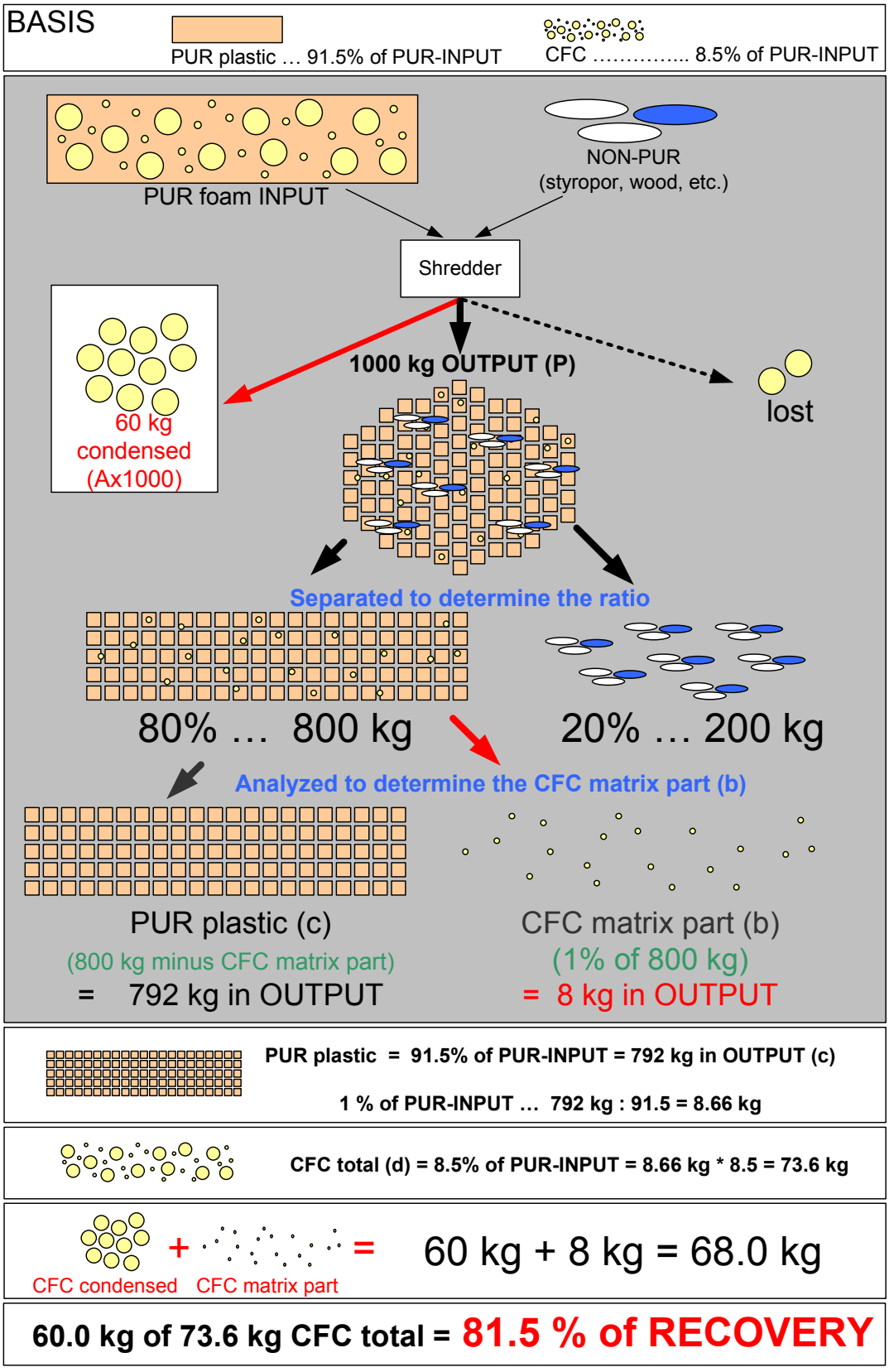
f. The degree of effectiveness based on the PU fraction produced is calculated with the following formula:

Recovery rate = total (Ax1000) / total (d + e)

g. The degree of effectiveness based on the input appliance mix introduced is calculated with the following formula:

Recovery rate = total (Ax1000) / total (Mx1000)

The following diagram serves to illustrate this analysis:



DIRECTIVE 5: DENTAL APPLIANCES

General

1.1 Unused dental appliances are considered hazardous waste and should be handled and treated accordingly. Refer to the Gauteng Department of Agriculture, Environment Conservation and Environment, Environment Conservation Act, 1989, Gauteng Health CareWaste Management Regulations, 2004 and The Department of Environment and Tourism's Starter Document for Health Care.

Processing Guidelines

2.1 For disused dental appliances, the following appliance parts, in addition to the appliance parts defined in the processing, storage and transport regulations for disused electronic appliances, must be separated manually and disposed of separately: amalgam separator (storage vessel) including in-feed suction tubes, 'chemoclave' filters, liquids from 'chemoclaves', developers from X-ray image developers, special oil from X-ray heads, hydraulic oil.

2.2 The storage vessel in the amalgam separator, which can be contaminated with amalgam, must be classified as hazardous waste and disposed of accordingly. (NB: although such storage vessels should already have been removed, it is possible for one to be forgotten).

2.3 Suction tubes which have supplied the amalgam separator with water contaminated with amalgam must be incinerated in a suitable plant with extensive flue gas cleaning (e.g. waste incineration plant), and must not, under any circumstances, be used for material recycling. Any metal fittings must be removed beforehand and recycled as metal.

2.4 'Chemoclave' filters which may contain permanganate and other substances must be disposed of in a waste incineration plant.

2.5 'Chemoclaves' must then be checked to determine whether they still contain liquids (alcohol/formaldehyde). If this is the case, this must be disposed of according to the minimum requirements for handling, classification and disposal of hazardous waste and SABS Code 0228 "The Identification and Classification of Dangerous Substances and Goods"

2.6 X-ray image developers must then be checked to determine whether they still contain liquid (developer). If this is the case, this must be disposed of appropriately.

2.7 Special oil from X-ray heads, as well as hydraulic oils (e.g. from chairs), are likely to contain PCB. Until clear data on this is available, these oils must be collected separately from one another (e.g. in 200-litre containers). As soon as one container is full, the oil must be analysed for PCB, and the method of disposal discussed with the controlling board.

2.8 Old autoclaves, heaters and possibly also chemoclaves could be insulated with asbestos. Such appliances must be examined to determine whether they contain asbestos. Appliances which are suspected to contain asbestos must not, under any circumstances, be further processed. They must be temporarily stored – well packaged (e.g. in a plastic bag) and clearly labelled – and must be disposed of by a company specialising in asbestos.

2.9 Medical equipment must be inspected for radioactivity. If elevated radiation values are found, the equipment must be referred to the Dept of Minerals & Energy (council for Nuclear Safety).

2.10 Due to the fact the commonly used appliances tend to be quite old, all capacitors are considered to be ‘PCB suspects’ and must be disposed of accordingly.

Hygiene and safety at the workplace

3.1 As the handling of dental appliances involves particular health risks, these must be dismantled separately from the usual material at specially designated work stations and with heightened safety precautions (see 2.2 – 2.4). If these work stations are also used to dismantle other electronic appliances, the heightened safety precautions (see 2.2 – 2.4) also apply for these.

3.2 When dismantling dental appliances, safety glasses and masks must be worn.

3.3 When dismantling dental appliances, acid-proof gloves must be worn and replaced regularly. After a work process is completed, the gloves (still being worn), and then the hands, must be disinfected.

3.4 Due to the risk of Hepatitis B infection, it is highly recommended that all persons involved with dismantling dental appliances are immunised for Hepatitis B.

Acceptance and storage

4.1 When accepting dental appliances, the precautionary measures in 3.2 to 3.4 must, as for dismantling, be observed, if operation is not purely mechanical, e.g. with a fork lift truck.

4.2 The waste disposal company must store dental appliances separately and clearly labelled.

4.3 Any fractions produced must be stored in such a way that there is no risk of injury.