SIVE, PAGET & RIESEL P.C.

Recycling Electronics in NY
An Overview

Maggie Macdonald
Associate

Why is Recycling Electronics Important?

- Electronics contain potentially harmful materials & valuable commodities
  - Recycling 1 million cell phones yields 35,000 lbs copper, 772 lbs silver, 75 lbs gold & 33 lbs palladium
- Improper disposal of electronics, including open dumping or burning, can contaminate air, soil and water & negatively impact human health
- E-waste generation is increasing

Regulatory Overview

- New York State Electronic Equipment Recycling & Reuse Act
- Federal CRT Rule
- Voluntary Certification to Independent Standards

New York State Electronic Equipment Recycling & Reuse Act

- Enacted in 2010
- Established disposal ban for "covered electronic equipment" in phases
- Creates convenience standard & performance goals
- Regulated entities:
  - Manufacturers, collectives, recyclers, consolidation facilities, collection sites, retailers, haulers, waste management facilities, consumers

Covered Electronic Equipment

- Computers
  - Including laptops, desktops, tablets & e-readers
- Computer peripherals
  - Monitors
  - Electronic keyboards
  - Electronic mice or similar pointing devices
  - fax machines
  - scanners
  - Printers
- Small scale servers
- Televisions
- Small electronic equipment
  - VCRs
  - DVRs
  - Portable digital music players
  - DVD players
  - Digital converter boxes
  - Cable or satellite receivers (including digital media receivers)
  - Electronic or video game consoles

Federal CRT Rule

- CRTs marked for disposal are hazardous waste under RCRA due to leaded glass
- Recycled CRT glass and used CRTs are not solid or hazardous waste under RCRA if certain conditions are met
  - Export requirements
  - Storage, labeling, transporting, accumulation & processing requirements
- NYSDEC CRT Policy

Image from EPA: https://www.epa.gov/hw/cathode-ray-tubes-crts-0

Independent Certification Standards

Qualities	R2 Responsible Recycling	E-Stewards
Program Owner	Sustainable Electronics Recycling International	Basel Action Network
Export Restrictions	Allows export to some non-OECD with appropriate documentation	No exports to non-OECD countries
Other Requirements	ISO 14001 & OHSAS 18001	ISO 14001
Fees	$1500 per site licensing fee	Based on revenues

Questions?

Maggie Macdonald

SIVE, PAGET & RIESEL P.C.

460 Park Avenue, 10th Floor

New York, NY 10022

mmacdonald@sprlaw.com

(212)-421-2150

NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

NYS Electronic Equipment Recycling and Reuse Act

Enforcement, Achievements and Challenges and Regulations

October 15, 2016

Jennifer Andaloro, Senior Attorney
Office of General Counsel
NYSDEC
Albany, NY
jennifer.andaloro@dec.ny.gov

CIVIL ENFORCEMENT (ECL §71-2729)

- 4 categories of penalties:
  - Consumer violations - $100.00 penalty per violation;
  - Solid waste carters and solid/hazardous waste management facilities - $250.00 penalty per violation
  - Manufacturers, collection sites, consolidation facilities, recycling facilities:
    - Failure to file a report, registration, fee or surcharge - $1,000 per day
    - Other violations - $1,000 for first; $2,500 for the second; $5,000 for the third
  - Retailers - $250 for first; $500 for second; $500 for third

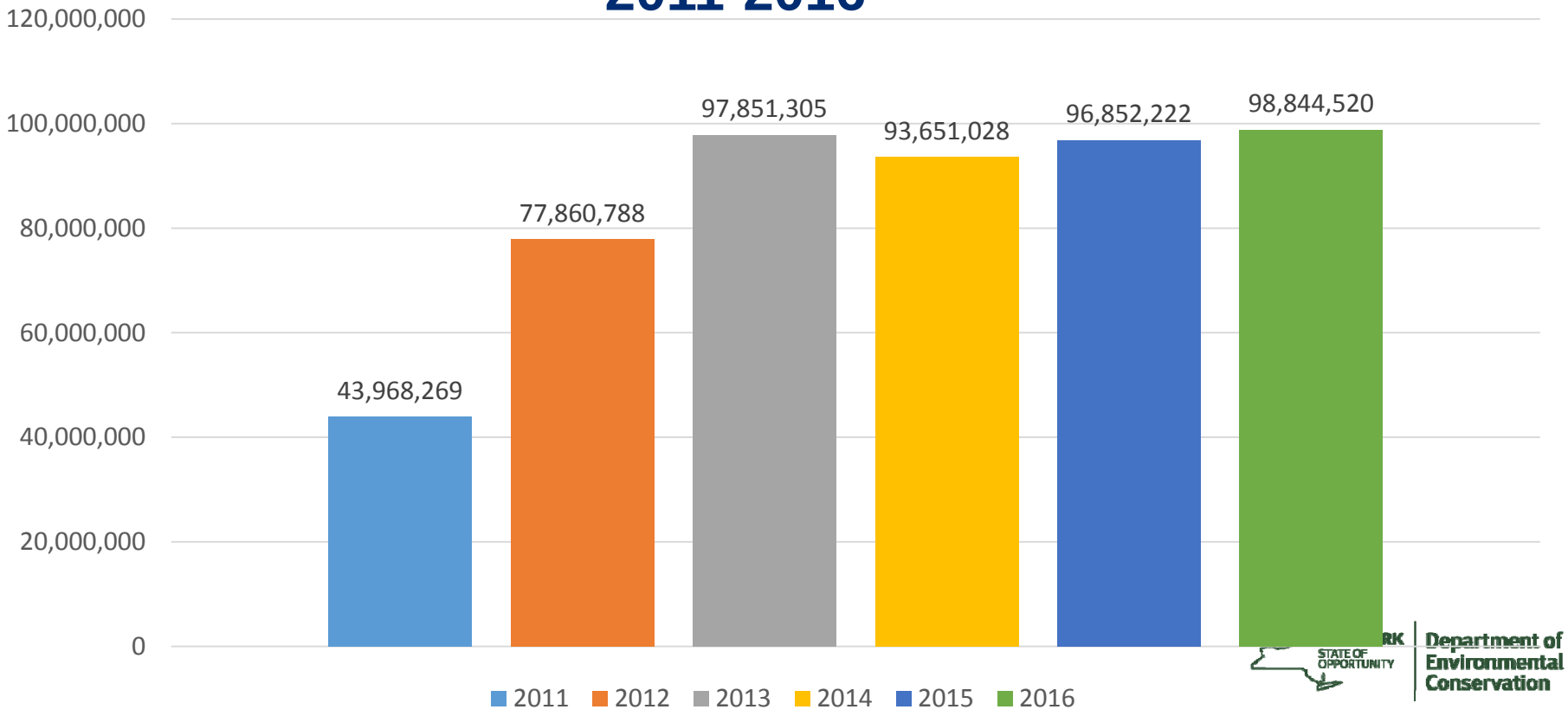
ENFORCEMENT EFFORTS

2012-2013 – Department focused on assisting and educating regulated entities on compliance issues.

2014 – Department issues notices of violations to 23 Manufacturers that failed to file annual report. Registrations of 4 manufacturers were revoked.

2015 – Department issued notices of violations to 10 manufacturers that failed to file annual report. Registrations of 5 manufacturers were revoked.

Statewide Recycling & Reuse Goal in Lbs. 2011-2016



Program Performance (2011-2015)

Statewide Goal vs. Reported Collection

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Recycling Surcharges (2012 - 2015)

Program Year	2012	2013	2014	2015
Manufacturers	10	9	10	10
Pounds under-collected	90,512	466,461	523,512	139,605
Surcharges issued	$41,922.30	$176,536.50	$242,848.70	$67,747.90
Surcharges paid	$41,922.30	$176,536.50	$239,571.20	$53,356.40

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Program Achievements

- Recycling rate increases in each program year:
  - 2011 – 2.3 lbs. per capita
  - 2012 – 4 lbs. per capita
  - 2013 – 5 lbs. per capita

- Total collected from 2011-2013: **221,813,671 lbs.**

- Enhanced recycling/reuse infrastructure throughout the state

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Program Challenges

- Manufacturer/Collective Program Compliance
- Cathode Ray Tube (CRT) Management
- DEC Implementation Challenges

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Manufacturer/Collective Program Compliance

- Acceptance Program Shortfalls:
  - Only meet minimal convenience requirements
  - Continuous brand/one-for-one collection
  - Program partnerships, contracts and agreements
  - Annual report non-submittal and incompleteness
  - Updating of critical program and contact information

Cathode Ray Tubes (CRTs)

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

CRT Glass Management

- Inadequate capacity to process discarded CRTs – large backlog
- 2013 North America in 2013 processing capacity of 128,000 tons/year compared to a needed capacity of as much as 390,000 tons/year.
- Due to the lack of processing capability and increased costs for proper CRT management, stockpiles of CRTs are being created.
- Potential new CRT processors – Texas, New York, and Virginia

DEC Implementation Challenges

- Unregistered manufacturers & other entities
- Data gathering, entry & verification
- Out-of-state entity tracking
- Timely acceptance standard distribution
- Compliance efforts

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Regulations

- Stakeholder meetings held October 2016
- Potential areas to be covered:
  - Surcharge waiver procedures/criteria
  - Premium services
  - Withdrawal from the program
  - Acceptance credit program
  - Covered electronic equipment
  - Continuous acceptance program requirements

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Thank You!

Jennifer Andaloro

Senior Attorney

Office of General Counsel
Minerals and Materials Management Bureau
NYSDEC
625 Broadway, Albany, NY 12233-7253
jennifer.andaloro@dec.ny.gov
518-402-9507

Fore more information visit DEC's E-waste Recycling Website:
http://www.dec.ny.gov/chemical/65583.html

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

greenchip™
ELECTRONIC WASTE SOLUTIONS

R2 2013 Responsible™ Recycling

NAID® MEMBER

www.greenchiprecycling.com

Bill Monteleone

Managing Partner

History of GreenChip

- Founded in 2012
- First R2 Recycler in New York City
- Based out of Brooklyn NY
- Certifications include:
  - R2:2013
  - ISO 1400:2004
  - OHSAS 18001:2007

Services offered include:

- E-waste recycling and pickups

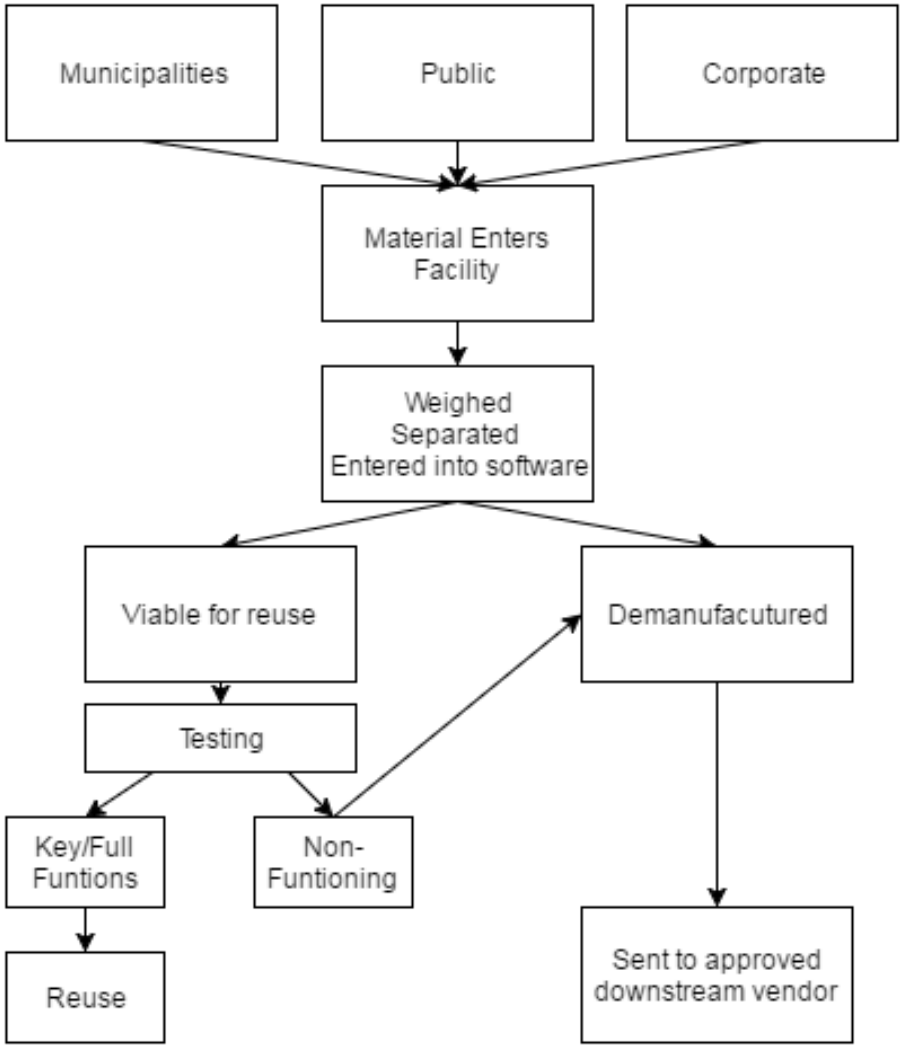
Services offered include:

- Hard drive shredding and sanitization

Services offered include:

- ITAD (IT Asset Disposition)

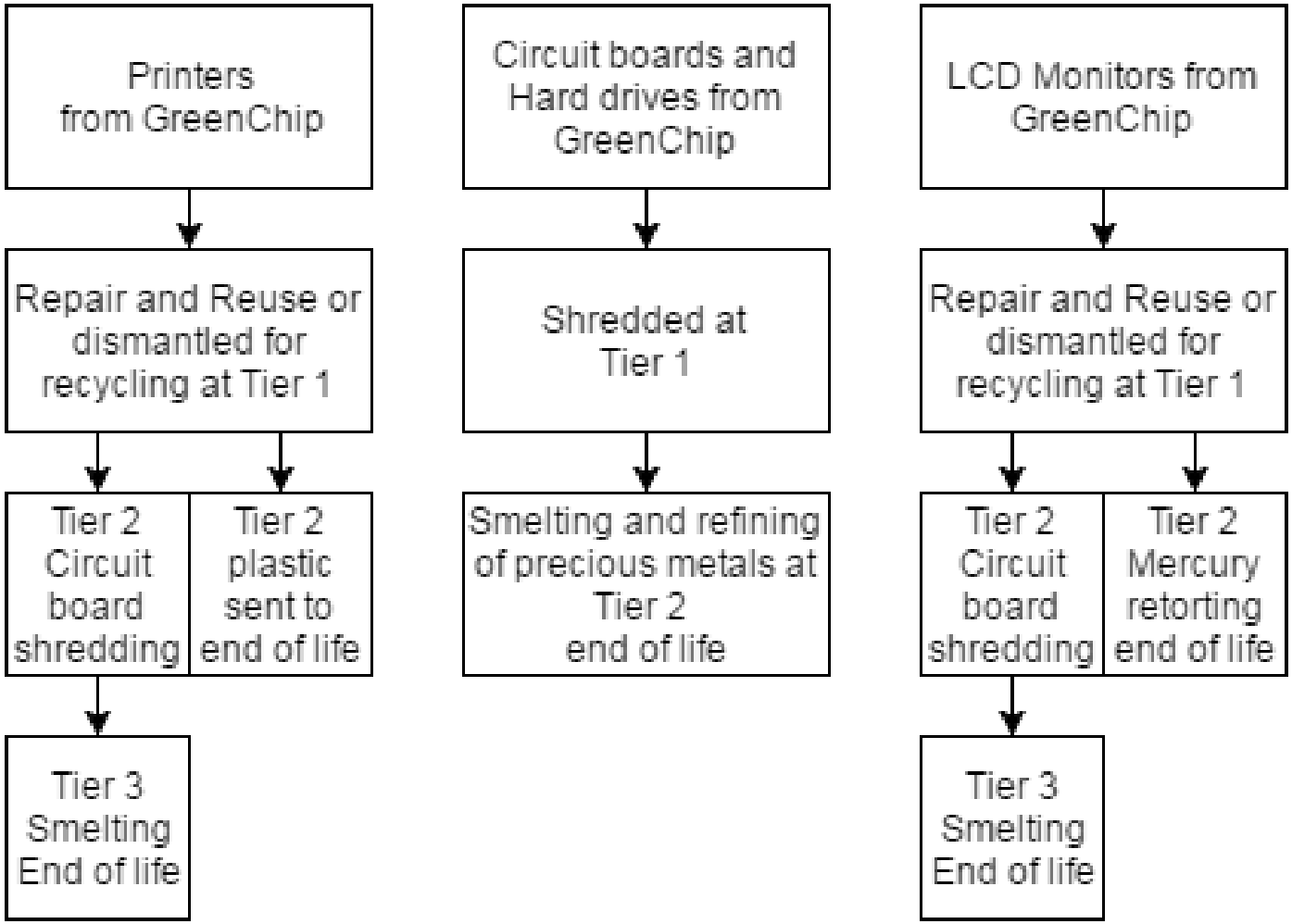
Flow of material through GreenChip



Flow of material through GreenChip

- Material enters facility and is tracked through proprietary software
- Items are weighed and separated by commodity type
- Equipment is inspected and designated for demanufacturing or reuse
- Equipment for reuse is tested under R2:2013 Provision 6 guidelines.
- Demanufactured equipment sent to approved downstream vendor

Flow of material downstream



Flow of material downstream

- Track Focus Materials until end of life
- Downstream vendors are audited and evaluated to ensure they meet our Focus Material Plan and can properly recycle
- Do not export to non-OECD countries
- Do not send materials to landfill

Environmental, Occupational Health & Safety

- R2:2013 is a more holistic approach to recycling
- Encompasses worker health and safety in addition to responsible recycling
- Creates a foundation for management system

NYS E-Waste Recycling & Reuse Act

- Shift in Market, low commodity values
- Many recyclers went out of business
- CEE (Covered Electronic Equipment)
- OEMs (Original Electronic Manufacturers)

Industry Forecast

- Can't rely on commodity value
- Traditional recycling methods don't work for electronic recycling
- Reuse and resale
- Working with OEMs

ENVIROMENTAL CONSERVATION LAW ARTICLE 27 TITLE 26

ELECTRONIC EQUIPMENT RECYCLING AND REUSE

§ 27-2601. Definitions.

As used in this title:

1. "Cathode ray tube" means a vacuum tube or picture tube used to convert an electronic signal into a visual image.

2. "Computer" means an electronic, magnetic, optical, electrochemical or other high-speed data processing device performing a logical, arithmetic or storage function, including a laptop computer and desktop computer, and includes any cable, cord, or wiring permanently affixed to or incorporated into such product, and may include both a computer central processing unit and a monitor; but such term shall not include an automated typewriter or typesetter, a portable hand-held calculator, a portable digital assistant, server, or other similar device.

3. "Computer peripheral" means a monitor; electronic keyboard; electronic mouse or similar pointing device; facsimile machine, document scanner, or printer intended for use with a computer; and includes any cable, cord, or wiring permanently affixed to or incorporated into any such product. Computer peripheral shall not include any document scanner or printer which weighs one hundred pounds or more.

4. "Consumer" means a person located in the state who owns or uses covered electronic equipment, including but not limited to an individual, a business, corporation, limited partnership, not-for-profit corporation, the state, a public corporation, public school, school district, private or parochial school or board of cooperative educational services or governmental entity, but does not include an entity involved in a wholesale transaction between a distributor and retailer.

5. "Covered electronic equipment" means: a computer; computer peripheral; small electronic equipment; small-scale server; cathode ray tube; or television, as defined in this section. "Covered electronic equipment" does not include any motor vehicle or any part thereof; camera or video camera; portable or stationary radio; household appliances such as clothes washers, clothes dryers, refrigerators, freezers, microwave ovens, ovens, ranges or dishwashers; equipment that is functionally or physically part of a larger piece of equipment intended for use in an industrial, research and development or commercial setting; security or anti-terrorism equipment; monitoring and control instrument or system; thermostat; hand-held transceiver; telephone of any type; portable digital assistant or similar device; calculator; global positioning

system (GPS) receiver or similar navigation device; a server other than a small-scale server; a cash register or retail self checkout system; a stand-alone storage product intended for use in industrial, research and development or commercial settings; commercial medical equipment that contains within it a cathode ray tube, a flat panel display or similar video display device, and is not separate from the larger piece of equipment; or other medical devices as that term is defined under the Federal Food, Drug and Cosmetic Act.

6. "Electronic waste" means covered electronic equipment that has been discarded or is no longer wanted by its owner, or for any other reason enters the waste collection, recovery, treatment, processing, or recycling system. For purposes of section 27-2611 of this title, "electronic waste" does not include the case, shell, or other enclosure of covered electronic equipment from which incorporated assemblies, sub-assemblies, components, materials, wiring, circuitry and commodities have been removed.

7. "Electronic waste collection site" means a facility at a fixed or temporary site at which electronic waste is accepted from consumers and temporarily stored for more than five days in a calendar year before such waste is transported to an electronic waste consolidation facility or electronic waste recycling facility. Electronic waste collection sites include, but are not limited to, dedicated sites and facilities for the acceptance of electronic waste, and retail stores and outlets, municipal or private electronic waste collection sites and not-for-profit donation sites that have agreed to accept electronic waste.

8. "Electronic waste consolidation facility" means a facility that receives and stores electronic waste for the purpose of organizing, categorizing or consolidating items of electronic waste before such waste is transported to an electronic waste recycling facility. Electronic waste consolidation facilities include, but are not limited to, facilities of brokers acting as intermediaries between electronic waste buyers and sellers, and regional centers at which electronic waste is organized, categorized or consolidated after being transported to such centers from electronic waste collection sites or other electronic waste consolidation facilities.

9. "Electronic waste recycling facility" means a facility at which electronic waste is recycled.

10. "Label" means a marker on the surface of covered electronic equipment conveying information; for the purposes of this title, labels must be permanent and can be attached, printed, engraved or incorporated in any other permanent way that is obvious and visible to users of the product.

11. "Manufacturer" means a person who: (a) assembles or substantially assembles covered electronic equipment for sale in the state; (b) manufactures covered electronic equipment under its own brand name or under any other brand name for sale in the state; (c) sells, under its own brand name, covered electronic equipment sold in the state; (d) owns a brand name that it licenses to another person for use on covered electronic equipment sold in the state; (e) imports covered electronic equipment for sale in the state; or (f) manufactures covered electronic equipment for sale in the state without affixing a brand name. "Manufacturer" does not mean a person who assembles or substantially assembles, and sells less than one thousand units of covered electronic equipment annually in this state, or whose primary business is the sale of covered electronic equipment which is comprised primarily of rebuilt, refurbished or used components. If more than one person is a manufacturer of a brand of covered electronic equipment, any such person may assume

responsibility for obligations of a manufacturer of that brand under this title. If none of those persons assumes responsibility for the obligations of a manufacturer under this title, any and all such persons jointly and severally may be considered to be the responsible manufacturer of that brand for purposes of this title.

12. "Manufacturer's brands" means a manufacturer's name, brand name or brand label, and all manufacturer's names, brand names and brand labels for which the manufacturer has a legal right or interest, including those names, brand names, and brand labels of companies that have been acquired by the manufacturer or in which the manufacturer asserts a legal interest such as trademark, license, service mark, or patent.

13. "Monitor" means a separate visual display component of a computer, whether sold separately or together with a computer central processing unit, and includes a cathode ray tube, liquid crystal display, gas plasma, digital light processing or other image projection technology, greater than four inches when measured diagonally, and its case, interior wires and circuitry, and any cable cord or wiring permanently affixed thereto or incorporated into such product.

14. "Person" means any individual, business entity, partnership, company, corporation, not-for-profit corporation, association, governmental entity, public benefit corporation, public authority, firm, organization, or any other group of individuals, or any officer or employee or agent thereof.

15. "Recycle" means to separate, dismantle or process the materials, components or commodities contained in electronic waste for the purpose of preparing the materials, components or commodities for use or reuse in new products or components thereof, but not for energy recovery or energy generation by means of combustion, gasification, pyrolysis or other means. Recycling includes the manual and mechanical separation of electronic waste to recover materials, components or commodities contained therein for the purpose of reuse or recycling, and changing the physical or chemical composition of electronic waste to segregate components for purposes of recycling those components.

16. "Retailer" means a person who sells covered electronic equipment to a person in the state through any means, including, but not limited to, transactions conducted through retail sales outlets, mail, catalogs, the telephone or the internet, or any electronic means. "Retailer" does not include a person who sells or offers for sale fewer than ten items of covered electronic equipment during a calendar year.

17. "Reuse" means the use of electronic waste that is tested and certified to be in good working order and which was removed from the waste stream for use for the same purpose for which it was manufactured, including the continued use of whole systems or components.

18. "Sell" or "sale" means any transfer for consideration of title or the right to use, from a manufacturer or retailer to a person, including, but not limited to, transactions conducted through retail sales outlets, catalogs, mail, the telephone, the internet, or any electronic means; this includes transfer of new products or used products that may have been refurbished by their manufacturer or manufacturer-approved party and that are offered for sale by a manufacturer or retailer, but does not include consumer-to-consumer second-hand transfer. "Sell or sale" does not include: (a) the transfer of used covered electronic equipment or a lease of covered electronic equipment; or (b) wholesale transactions among a manufacturer, wholesaler and retailer.

19. "Small electronic equipment" means any portable digital music player that has memory capability and is battery-powered, video cassette recorder, a digital video disc player, digital video recorder, digital

converter box, cable or satellite receiver, or electronic or video game console, and includes any cable, cord, or wiring permanently affixed to or incorporated into any such product.

20. "Small-scale server" means a computer that typically uses desktop components in a desktop form factor, but is designed primarily to be a storage host for other computers. To be considered a small-scale server, a computer must have the following characteristics: designed in a pedestal, tower, or other form factor similar to those of desktop computers such that all data processing, storage, and network interfacing is contained within one box or product; intended to be operational twenty-four hours per day and seven days a week, and unscheduled downtime is extremely low, such as on the order of hours per year; is capable of operating in a simultaneous multi-user environment serving several users through networked client units; and designed for an industry accepted operating system for home or low-end server applications.

21. "Television" means a display system containing a cathode ray tube or any other type of display primarily intended to receive video programming via broadcast, cable or satellite transmission, having a viewable area greater than four inches when measured diagonally.

§ 27-2603. Manufacturer collection; recycling surcharge.

1. (a) Beginning April first, two thousand eleven, a manufacturer of covered electronic equipment must accept for collection, handling and recycling or reuse electronic waste for which it is the manufacturer. Such waste shall count toward the amount of electronic waste required to be accepted pursuant to subdivision four of this section.

(b) Beginning April first, two thousand eleven, a manufacturer of covered electronic equipment must accept for collection, handling and recycling or reuse one piece of electronic waste of any manufacturer's brand if offered by a consumer with the purchase of covered electronic equipment of the same type by a consumer. Such waste shall count toward the amount of the electronic waste required to be accepted pursuant to subdivision four of this section.

2. Beginning April first, two thousand eleven, each manufacturer must accept for collection, handling and recycling or reuse the manufacturer's acceptance standard as specified in subdivision four of this section.

3. Statewide recycling or reuse goal. (a) For the period from April first, two thousand eleven through December thirty-first, two thousand eleven, the statewide recycling or reuse goal for electronic waste shall be the product of the latest population estimate for the state, as published by the U.S. Census bureau multiplied by three pounds multiplied by three-quarters.

(b) For calendar year two thousand twelve, the statewide recycling or reuse goal for all electronic waste shall be the product of the latest population estimate for the state, as published by the U.S. Census bureau multiplied by four pounds.

(c) For calendar year two thousand thirteen, the statewide recycling or reuse goal for all electronic waste shall be the product of the latest population estimate for the state, as published by the U.S. Census bureau multiplied by five pounds.

(d) For calendar year two thousand fourteen and annually thereafter, the statewide recycling or reuse goal for all electronic waste is the product of the base weight multiplied by the goal attainment percentage. For the purposes of this paragraph, "base weight" means the greater of:

(i) the average weight of all electronic waste collected for recycling or reuse during the previous three calendar years as reported to the department pursuant to paragraph (b) of subdivision one of section 27-2617 of this title; or (ii) the three year average of the sum of all electronic waste collected for recycling or reuse during the previous three calendar years based on information reported to the department pursuant to paragraph (b) of subdivision one, paragraph (b) of subdivision two and paragraph (b) of subdivision three of section 27-2613 of this title.

(e) The "goal attainment percentage" means:

(i) ninety percent if the base weight is less than ninety percent of the statewide recycling or reuse goal for the previous calendar year;

(ii) ninety-five percent if the base weight is ninety percent or greater, but does not exceed ninety-five percent of the statewide recycling or reuse goal for the previous calendar year;

(iii) one hundred percent if the base weight is ninety-five percent or greater, but does not exceed one hundred five percent of the statewide recycling or reuse goal for the previous calendar year;

(iv) one hundred five percent if the base weight is one hundred five percent or greater, but does not exceed one hundred ten percent of the statewide recycling or reuse goal for the previous calendar year; and

(v) one hundred ten percent if the base weight is one hundred ten percent or greater of the statewide recycling or reuse goal for the previous calendar year.

4. Manufacturer acceptance standard. (a) For the period April first, two thousand eleven through December thirty-first, two thousand eleven and annually thereafter, each manufacturer's acceptance standard is the product of the statewide recycling or reuse goal under paragraph (a), (b), (c) or (d) of subdivision three of this section, as appropriate, multiplied by that manufacturer's market share pursuant to paragraph (b) of this subdivision.

(b) Each manufacturer's market share of electronic waste shall be determined by the department based on the manufacturer's percentage share of the total weight of covered electronic equipment sold as determined by the best available information, including, but not limited to, state sales data reported by weight. Beginning April first, two thousand eleven, and every calendar year thereafter, the department shall provide each manufacturer with a determination of its market share of electronic waste which shall be the quotient of the total weight of the manufacturer's covered electronic equipment sold to persons in this state based on the average annual retail sales during the preceding three calendar years, as reported under sections 27-2605 and 27-2617 of this title divided by the total weight of all manufacturers covered electronic equipment sold to persons in this state based on the average annual retail sales during the preceding three calendar years, as reported under sections 27-2605 and 27-2617 of this title.

5. In the absence of a waiver by the department pursuant to subdivision three of section 27-2615 of this title, beginning in calendar year two thousand thirteen, a manufacturer that fails to meet its manufacturer's acceptance standard for the previous calendar year as required by subdivision four of this section shall be subject to a recycling surcharge, determined as follows:

(a) If a manufacturer accepts at least ninety percent but less than one hundred percent of its manufacturer's acceptance standard as required by subdivision four of this section, the surcharge shall be thirty cents multiplied by the number of additional pounds of electronic waste that should have been accepted by such manufacturer.

(b) If a manufacturer accepts at least fifty percent but less than ninety percent of its manufacturer's acceptance standard as required by subdivision four of this section, the surcharge shall be forty cents multiplied by the number of additional pounds of electronic waste that should have been accepted by such manufacturer.

(c) If a manufacturer accepts less than fifty percent of its manufacturer's acceptance standard as required by subdivision four of this section, the surcharge shall be fifty cents multiplied by the number of additional pounds of electronic waste that should have been accepted by such manufacturer.

6. The recycling surcharge shall be paid to the department with the annual report required pursuant to section 27-2617 of this title.

7. Beginning with calendar year two thousand fourteen, if a manufacturer accepts more than its manufacturer's acceptance standard as required by subdivision four of this section, the excess weight may be used as electronic waste acceptance credits and may be sold, traded, or banked for a period no longer than three calendar years succeeding the year in which the credits were earned; provided, however, that no more than twenty-five percent of a manufacturer's obligation for any calendar year may be met with recycling credits generated in a prior calendar year.

§ 27-2605. Manufacturer electronic waste registration and responsibilities.

1. A manufacturer shall submit a registration on a form prescribed by the department to the department by January first, two thousand eleven, along with a registration fee of five thousand dollars. The department may require such form to be filed electronically. Such registration shall include:

(a) the manufacturer's name, address, and telephone number;

(b) the name and title of an officer, director, or other individual designated as the manufacturer's contact for purposes of this title;

(c) a list identifying the manufacturer's brands;

(d) a general description of the manner in which the manufacturer will comply with section 27-2603 of this title, including specific information on the manufacturer's electronic waste acceptance program in the state, and a current list of locations within the state where consumers may return electronic waste;

(e) sales data reported by weight for the manufacturer's covered electronic equipment sold in this state for the previous three calendar years, categorized by type to the extent known. If the manufacturer cannot provide accurate state sales data, it must explain why such data cannot be provided, and estimate state sales data by (i) dividing its national sales data by weight by the national population according to the most recent census and multiplying the result by the population of the state, or (ii) another method approved by the department;

(f) a statement disclosing whether: (i) any covered electronic device sold in this state exceeds the maximum concentration values established for lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs), and polybrominated diphenyl ethers (PBDEs) under the restriction of hazardous substances directive (RoHS) pursuant to 2002/95/EC of the European Parliament and Council and any amendments thereto and if so, a listing of any covered electronic equipment that is not in compliance with such directive; or (ii) the manufacturer has received an exemption from one or more of those maximum concentration

values under the RoHS directive that has been approved and published by the European Commission; and

(g) any other information as the department may require.

2. A manufacturer's registration is effective upon acceptance by the department and must be updated within thirty days of any material change to the information required by subdivision one of this section.

3. Any person who becomes a manufacturer on or after January first, two thousand eleven shall register with the department prior to selling or offering for sale in the state any covered electronic equipment, and must comply with the requirements of this title.

4. No later than April first, two thousand eleven, a manufacturer shall not sell or offer for sale electronic equipment in the state unless the manufacturer has registered with the department and maintains an electronic waste acceptance program through which the manufacturer, either directly or through an agent or designee, accepts electronic waste from consumers in the state for recycling. The manufacturer shall ensure that retailers are notified of such registration.

5. The electronic waste acceptance program shall include, at a minimum:

(a) collection, handling and recycling or reuse of electronic waste pursuant to section 27-2603 of this title in a manner convenient to consumers. The following acceptance methods shall be considered reasonably convenient: (i) mail or ship back return programs; (ii) collection or acceptance events conducted by the manufacturer or the manufacturer's agent or designee, including events conducted through local governments or private parties; (iii) fixed acceptance locations such as dedicated acceptance sites operated by the manufacturer or its agent or designee; (iv) agreements with local governments, retail stores, sales outlets and not-for-profit organizations which have agreed to provide facilities for the collection of electronic waste; (v) community collection events; and (vi) any combination of these or other acceptance methods which effectively provide for the acceptance of electronic waste for recycling or reuse through means that are available and reasonably convenient to consumers in the state. At a minimum, the manufacturer shall ensure that all counties of the state, and all municipalities which have a population of ten thousand or greater, have at least one method of acceptance that is available within such county or municipality. The department may establish additional requirements to ensure convenient collection from consumers;

(b) information on how consumers can destroy all data on any electronic waste, either through physical destruction of the hard drive or through data wiping;

(c) a public education program to inform consumers about the manufacturer's electronic waste acceptance program, including at a minimum: (i) an internet website and a toll-free telephone number and written information included in the product manual for, or at the time of sale of, covered electronic equipment that provides sufficient information to allow a consumer of covered electronic equipment to learn how to return the covered equipment for recycling or reuse, and in the case of manufacturers of computers, hard drives and other covered electronic equipment that have internal memory on which personal or other confidential data can be stored, such website shall provide instructions for how consumers can destroy such data before surrendering the products for recycling or reuse; (ii) advertisements and press releases if any; and

(d) any other information as required by the department in accordance with regulations promulgated pursuant to this article.

6. A manufacturer shall maintain records demonstrating compliance with

this title and make them available for audit and inspection by the department for a period of three years.

7. A manufacturer may satisfy the electronic waste collection requirements of this section by agreeing to participate in a collective electronic waste acceptance program with other manufacturers. Any such collective electronic waste acceptance program must meet the same requirements as an individual manufacturer. Any collective electronic waste acceptance program must include a list of manufacturers that are participating in such program along with other identifying information as may be required by the department. Such program shall submit a registration to the department along with a registration fee of ten thousand dollars.

8. A manufacturer shall be responsible for all costs associated with the implementation of the electronic waste acceptance program. The manufacturer shall not charge consumers for the collection, handling and recycling and reuse of electronic waste, provided that such prohibition shall not apply to a charge on business consumers or to charges for premium services. This prohibition shall not apply to a manufacturer's contract with a consumer for the collection, handling, recycling or reuse of electronic waste that was entered into prior to the effective date of this section. For purposes of this subdivision, "business consumer" means a for-profit entity which has fifty or more full time employees or a not-for-profit corporation with seventy-five or more full time employees, but not a not-for-profit corporation designated under section 501(c)(3) of the internal revenue code. For purposes of this subdivision, "premium services" means equipment and data security services, refurbishment for reuse by the consumer, and other custom services as may be determined by the department.

§ 27-2607. Retailer requirements.

1. At the location of sale of covered electronic equipment, a retailer shall provide purchasers of covered electronic equipment with information, if any, about opportunities for the return of electronic waste that has been provided to the retailer by a manufacturer.

2. Beginning April first, two thousand eleven, no retailer shall sell or offer for sale in the state any covered electronic equipment unless the manufacturer and the manufacturer's brands are registered with the department pursuant to section 27-2605 of this title. If the retailer purchased covered electronic equipment from a manufacturer who fails to register by January first, two thousand eleven, or prior to the date the manufacturer withdrew its registration or the registration was revoked by the department, the retailer may continue to sell the covered electronic equipment for one hundred eighty days after April first, two thousand eleven, or the date the registration was withdrawn or revoked.

§ 27-2609. Labeling.

Beginning April first, two thousand eleven, a manufacturer may not offer for sale in the state or deliver to retailers for subsequent sale covered electronic equipment unless it has a visible, permanent label clearly identifying the manufacturer of that equipment.

§ 27-2611. Disposal ban.

1. Beginning April first, two thousand eleven, no manufacturer, retailer, or owner or operator of an electronic waste collection site, electronic waste consolidation facility or electronic waste recycling facility in the state shall dispose of electronic waste at a solid waste management facility or hazardous waste management facility, or place electronic waste for collection which is intended for disposal at a solid waste management facility or hazardous waste management facility.

2. Beginning January first, two thousand twelve, no person except for an individual or household shall place or dispose of any electronic waste in any solid waste management facility, or place electronic waste for collection which is intended for disposal at a solid waste management facility or hazardous waste management facility in this state. Persons engaged in the collection of solid waste for delivery to a solid waste management facility shall provide written information to users of such facility on the proper methods for the recycling of electronic waste.

3. Beginning January first, two thousand fifteen, no individual or household shall place or dispose of any electronic waste in any solid waste management facility, or place electronic waste for collection which is intended for disposal at a solid waste management facility or hazardous waste management facility in this state.

4. Beginning January first, two thousand twelve, an owner or operator of a solid waste management facility or hazardous waste management facility shall educate users of such facility on the proper methods for the management of electronic waste. Such education shall include:

(a) providing written information to users of such facility on the proper methods for recycling of electronic waste; and

(b) posting, in conspicuous locations at such facility, signs stating that electronic waste may not be disposed of at the facility.

§ 27-2613. Electronic waste collection, consolidation and recycling.

1. Electronic waste collection sites. No later than January first, two thousand eleven, each person who owns or operates an electronic waste collection site in the state shall:

(a) register with the department on a form prescribed by the department. The department may require such form to be filed electronically. The registration shall include: (i) the name, address, and telephone number of the owners and the operators of the electronic waste collection site; and (ii) the name, address, and telephone number of the electronic waste collection site. Any person who commences the operation of an electronic waste collection site on or after January first, two thousand eleven shall register with the department at least thirty days prior to receiving any electronic waste at such collection site. A registration is effective upon acceptance by the department. In the case of collection sites operated by a retailer, a single registration listing the name, address, and telephone number of the individual collection sites may be submitted covering all their collection sites;

(b) beginning March first, two thousand twelve, each person operating an electronic waste collection site shall submit to the department an annual report for the period of April first, two thousand eleven through December thirty-first, two thousand eleven and each calendar year thereafter, on a form prescribed by the department. The department may require annual reports to be filed electronically. Annual reports shall

include, but not be limited to, the following information: (i) the quantity, by weight, of electronic waste received from consumers in the state; (ii) the name and address of each person to whom the electronic waste collection site sent electronic waste during the reporting period, along with the quantity, by weight, of electronic waste that was sent to each such person; and (iii) the weight of electronic waste collected on behalf of or pursuant to an agreement with each manufacturer during the reporting period. All quantities of electronic waste reported by the collection site must separately include electronic waste generated by New York state consumers and electronic waste received from or shipped outside the state;

(c) manage electronic waste in a manner that complies with all applicable laws, rules and regulations;

(d) store electronic waste (i) in a fully enclosed building with a roof, floor and walls, or (ii) in a secure container (e.g., package or vehicle), that is constructed and maintained to minimize breakage of electronic waste and to prevent releases of hazardous materials to the environment;

(e) remove electronic waste from the site within one year of the waste's receipt at the site, and maintain records demonstrating compliance with this requirement.

2. Electronic waste consolidation facilities. (a) No later than January first, two thousand eleven, each person who operates an electronic waste consolidation facility in the state shall register with the department on a form prescribed by the department. The department may require such form to be filed electronically. The registration shall include: (i) the name, address and telephone number of the owner and the operator of the facility; and (ii) the name, address and telephone number of the electronic waste consolidation facility. Any person who commences the operation of an electronic waste consolidation facility on or after January first, two thousand eleven shall register with the department at least thirty days prior to receiving any electronic waste. A registration is effective upon acceptance by the department. Any registration required by this paragraph shall be accompanied by a registration fee of two hundred fifty dollars.

(b) Beginning March first, two thousand twelve, each person operating an electronic waste consolidation facility shall submit to the department an annual report for the period of April first, two thousand eleven through December thirty-first, two thousand eleven and each calendar year thereafter, on a form prescribed by the department. The department may require annual reports to be filed electronically. Annual reports shall include, but not be limited to, the following information: (i) the name and address of each electronic waste collection site from which the consolidation facility received electronic waste during the reporting period, along with the quantity, by weight, of electronic waste received from each collection site; (ii) the name and address of each person to whom the electronic waste consolidation facility sent electronic waste during the reporting period, along with the quantity, by weight, of electronic waste that was sent to each such person; (iii) the weight of electronic waste collected on behalf of or pursuant to an agreement with each manufacturer during the reporting period; and (iv) a certification by the owner or operator of the electronic waste consolidation facility that such a facility has complied with the requirements of this title and all other applicable laws, rules, and regulations. All quantities of electronic waste reported by the consolidation facility must separately include electronic waste generated by New York state consumers and electronic waste received from or shipped outside the state.

(c) Each person operating an electronic waste consolidation facility shall:

(i) manage electronic waste in a manner that complies with all applicable laws, rules and regulations;

(ii) store electronic waste (A) in a fully enclosed building with a roof, floor and walls, or (B) in a secure container (e.g., package or vehicle), that is constructed and maintained to minimize breakage of electronic waste and to prevent releases of hazardous materials to the environment;

(iii) have a means to control entry, at all times, to the active portion of the facility;

(iv) inform all employees who handle or have responsibility for managing electronic waste about the proper handling and emergency procedures appropriate to the type or types of electronic waste handled at the facility;

(v) remove electronic waste from the site within one year of the waste's receipt at the site, and maintain records demonstrating compliance with this requirement; and

(vi) maintain the records required by paragraphs (a) and (b) of this subdivision and by subparagraph (v) of this paragraph on site and make them available for audit and inspection by the department for a period of three years.

(d) A person operating an electronic waste consolidation facility shall not engage in electronic waste recycling unless such person is also registered as an electronic waste recycling facility, and complies with the requirements of this section that are applicable to each type of facility.

(e) A person operating an electronic waste consolidation facility may accept electronic waste in the same manner as an electronic waste collection site provided that such person complies with the requirements of this section that are applicable to electronic waste collection sites.

3. Electronic waste recycling facilities. (a) No later than January first, two thousand eleven, each person operating an electronic waste recycling facility in the state shall register with the department on a form prescribed by the department. The department may require such form to be filed electronically. The registration shall include: (i) the name, address and telephone number of the owner and the operator of the facility; and (ii) the name, address, and telephone number of the electronic waste recycling facility. Any person who commences the operation of an electronic waste recycling facility on or after January first, two thousand eleven shall register with the department at least thirty days prior to receiving any electronic waste. A registration is effective upon acceptance by the department. Any registration required by this paragraph shall be accompanied by a registration fee of two hundred fifty dollars.

(b) Beginning March first, two thousand twelve, each person operating an electronic waste recycling facility shall submit to the department an annual report for the period of April first, two thousand eleven through December thirty-first, two thousand eleven and each calendar year thereafter, on a form prescribed by the department. The department may require annual reports to be filed electronically. Annual reports shall include, but not be limited to, the following information: (i) the quantity, by weight, of electronic waste received from consumers in the state; (ii) the name and address of each electronic waste collection site and electronic waste consolidation facility from which electronic waste was received during the reporting period, along with the quantity,

by weight, of electronic waste received from each person; (iii) the name and address of each person to whom the facility sent electronic waste or component materials during the reporting period, along with the quantity, by weight, of electronic waste or component materials thereof sent to each such person; (iv) the weight of electronic waste collected on behalf of or pursuant to an agreement with each manufacturer during the reporting period; and (v) a certification by the owner or operator of the facility that such facility has complied with the requirements of this title and all other applicable laws, rules, and regulations. All quantities of electronic waste reported by the recycling facility must separately include electronic waste generated by New York state consumers and electronic waste received from or shipped outside the state.

(c) Each person operating an electronic waste recycling facility shall:

(i) manage and recycle electronic waste in a manner that complies with all applicable laws, rules and regulations;

(ii) store electronic waste (A) in a fully enclosed building with a roof, floor and walls, or (B) in a secure container (e.g., package or vehicle), that is constructed and maintained to minimize breakage of electronic waste and to prevent releases of hazardous materials to the environment;

(iii) have a means to control entry, at all times, through gates or other entrances to the active portion of the facility;

(iv) inform all employees who handle or have responsibility for managing electronic waste about proper handling and emergency procedures appropriate to the type or types of electronic waste handled at the facility;

(v) remove electronic waste from the site within one year of the waste's receipt at the site, and maintain records demonstrating compliance with this requirement; and

(vi) maintain the records required by paragraphs (a) and (b) of this subdivision and by subparagraph (v) of this paragraph on site and make them available for audit and inspection by the department for a period of three years.

(d) A person operating an electronic waste recycling facility may also operate such facility as an electronic waste consolidation facility provided that such person complies with the requirements of this section that are applicable to each type of facility. Where a facility is operated for both purposes, only one registration fee must be paid.

(e) A person operating an electronic waste recycling facility may accept electronic waste in the same manner as an electronic waste collection site provided that such person complies with the requirements of this section that are applicable to electronic waste collection sites.

4. Except to the extent otherwise required by law, no manufacturer or person operating an electronic waste collection site, electronic waste consolidation facility or electronic waste recycling facility shall have any responsibility or liability for any data in any form stored on electronic waste surrendered for recycling or reuse, unless such person misuses or knowingly and intentionally, or with gross negligence, discloses the data. This provision shall not prohibit any such person from entering into agreements that provide for the destruction of data on covered electronic equipment.

§ 27-2615. Department responsibilities.

1. The department is authorized to promulgate rules and regulations necessary to implement and administer this title. At a minimum, the department shall promulgate rules and regulations on: standards for reuse; electronic waste acceptance credits; waivers of the recycling surcharge; and acceptable alternative methods for the determination of state sales data.

2. The department shall (a) maintain a list of manufacturers who are registered pursuant to section 27-2605 of this title, (b) maintain a list of each such manufacturer's brands, and (c) post such lists on the department's website.

3. The department may waive the recycling surcharge payable by a manufacturer under this title when the manufacturer demonstrates in an application to the department it was unable to accept the weight of electronic waste required by section 27-2603 of this title despite the manufacturer's best efforts. The application shall be made with the annual report required by section 27-2617 of this title. The application shall include such information as the department requires. A waiver provided pursuant to this subdivision shall not relieve a manufacturer from the obligation to comply with the provisions of this title not specifically addressed in such waiver.

§ 27-2617. Reporting requirements.

1. Beginning March first, two thousand twelve, for the period of April first, two thousand eleven through December thirty-first, two thousand eleven and each calendar year thereafter, a manufacturer that offers covered electronic equipment for sale in this state shall submit a report to the department on a form prescribed by the department that includes the following:

(a) sales data reported by weight for the manufacturer's covered electronic equipment sold in this state for the previous three calendar years, categorized by type to the extent known. If the manufacturer cannot provide accurate state sales data, it must explain why such data cannot be provided, and estimate state sales data by (i) dividing its national sales data by weight by the national population according to the most recent census and multiplying the result by the population of the state, or (ii) another method approved by the department;

(b) the quantity, by weight, of electronic waste collected for recycling or reuse in this state, categorized by the type of covered electronic equipment collected during the reporting period, the methods used to accept the electronic waste, and the approximate weight of electronic waste accepted by each method used to the extent known;

(c) all quantities of electronic waste reported by the manufacturer must separately include electronic waste generated by New York state consumers and electronic waste received from or shipped outside the state: (i) the quantity, by weight, of electronic waste received directly from consumers in the state through a mail back program; (ii) the name and address of each electronic waste collection site, electronic waste consolidation facility, and electronic waste recycling facility at which electronic waste from consumers was received on behalf of the manufacturer during the reporting period, along with the quantity, by weight, of electronic waste received; and (iii) the name and address of each person to whom the manufacturer sent electronic waste or component materials during the reporting period, along with the quantity, by

weight, of electronic waste or component materials thereof sent to each such person;

(d) the number of electronic waste acceptance credits purchased, sold, banked and traded during the reporting period, the number of electronic waste acceptance credits used to meet the requirements of section 27-2603 of this title, and from whom they were purchased and to whom they were sold or traded, and the number of electronic waste acceptance credits retained as of the date of the report;

(e) the amount of any recycling surcharge owed for the reporting period, with sufficient information to demonstrate the basis for the calculation of the surcharge;

(f) the names and locations of electronic waste recycling facilities utilized by the manufacturer and entities to which electronic waste is sent for reuse, whether in the state or outside the state, including details on the methods of recycling or reuse of electronic waste, any disassembly or physical recovery operation used, and the environmental management measures implemented by such recycling facility or entity;

(g) information detailing the acceptance methods made available to consumers in municipalities which have a population of greater than ten thousand and in each county of the state to meet the requirements of paragraph (a) of subdivision five of section 27-2605 of this title;

(h) a brief description of its public education program including the number of visits to the internet website and calls to the toll-free telephone number provided by the manufacturer as required by section 27-2605 of this title;

(i) any other information as required by the department; and

(j) a signature by an officer, director, or other individual affirming the accuracy of the report.

2. The department may require annual reports to be filed electronically.

3. The report shall be accompanied by an annual reporting fee of three thousand dollars, and any recycling surcharge due pursuant to section 27-2603 of this title.

4. The department shall submit a report on implementation of the title in this state to the governor and legislature by April first, two thousand twelve and every two years thereafter. The report must include, at a minimum, an evaluation of:

(a) the electronic waste stream in the state;

(b) recycling and reuse rates in the state for covered electronic equipment;

(c) a discussion of compliance and enforcement related to the requirements of this title;

(d) recommendations for any changes to this title; and

(e) a discussion of opportunities for business development in the state related to the acceptance, collection, handling and recycling or reuse of electronic equipment in this state.

§ 27-2619. Preemption.

Jurisdiction in all matters pertaining to electronic waste recycling, including but not limited to the obligations of manufacturers, retailers, electronic waste collection sites, electronic waste consolidation facilities and electronic waste recycling facilities with respect to electronic waste recycling, is, by this title, vested exclusively in the state. Any provision of any local law or ordinance, or any rule or regulation promulgated thereto, governing covered electronic equipment and

the collection, reuse, or recycling of electronic waste shall upon the effective date of this title be preempted.

§ 27-2621. Disposition of fees.

All fees and charges collected pursuant to this title shall be deposited into the environmental protection fund established pursuant to section ninety-two-s of the state finance law.

§ 71-2729. Enforcement of title 26 of article 27 of this chapter.

1. a. Any consumer, as defined in title twenty-six of article twenty-seven of this chapter, who violates any provision of, or fails to perform any duty imposed by, section 27-2611 of this chapter, shall be liable for a civil penalty not to exceed one hundred dollars for each violation.

b. Any person, except a consumer, manufacturer, or an owner or operator of an electronic waste collection site, electronic waste consolidation facility, or electronic waste recycling facility as these terms are defined in title twenty-six of article twenty-seven of this chapter, who violates any provision, or fails to perform any duty imposed by section 27-2611 of this chapter, shall be liable for a civil penalty not to exceed two hundred fifty dollars for each violation.

c. Any manufacturer, or any person operating an electronic waste collection site, an electronic waste consolidation facility, or an electronic waste recycling facility as those terms are defined in title twenty-six of article twenty-seven of this chapter, who:

i. fails to submit any report, registration, fee, or surcharge to the department as required by title twenty-six of article twenty-seven of this chapter shall be liable for a civil penalty not to exceed one thousand dollars for each day such report, registration, fee, or surcharge is not submitted; and

ii. violates any other provision of title twenty-six of article twenty-seven of this chapter or fails to perform any duty imposed by such title, except for subdivision four of section 27-2603 of this chapter, shall be liable for a civil penalty for each violation not to exceed one thousand dollars for the first violation, two thousand five hundred dollars for the second violation and five thousand dollars for the third and subsequent violations of this title within a twelve-month period.

d. Any retailer, as defined by section 27-2601 of this chapter, who violates any provision of title twenty-six of article twenty-seven of this chapter or fails to perform any duty imposed by such title, shall be liable for a civil penalty for each violation not to exceed two hundred fifty dollars for the first violation, five hundred dollars for the second violation and one thousand dollars for the third and subsequent violations of this title in a twelve-month period.

e. Civil penalties under this section shall be assessed by the commissioner after a hearing or opportunity to be heard pursuant to the provisions of section 71-1709 of this article, or by the court in any action or proceeding pursuant to this section, and, in addition thereto, such person may by similar process be enjoined from continuing such violation.

2. All penalties collected pursuant to this section shall be paid over to the commissioner for deposit to the environmental protection fund established pursuant to section ninety-two-s of the state finance law.

NEW YORK
STATE OF
OPPORTUNITY.

Department of
Environmental
Conservation

NYS E-WASTE RECYCLING & REUSE ACT

Implementation & Results for 2011 and 2012

Report to the Governor and Legislature – January 2016

Contents

I. Legislative Charge

The New York State Department of Environmental Conservation (Department) submits this report to the Governor and Legislature in accordance with Section 27-2617(4) of the New York State Electronic Equipment Recycling and Reuse Act (Act), Environmental Conservation Law Article 27, Title 26. That section requires a biennial report on the implementation of the Act that includes an evaluation of the electronic waste stream in the state; recycling and reuse rates in the state for covered electronic equipment; a discussion of compliance and enforcement related to the requirements of the Act; recommendations for any changes to Title 26; and a discussion of opportunities for business development in the state related to the acceptance, collection, handling and recycling or reuse of electronic equipment.

II. Executive Summary

The Act was signed into law by the Governor on May 28, 2010 and became the Nation's 22nd electronic waste (e-waste) product stewardship law. The passing of this key product stewardship legislation was a major step in moving New York State closer to achieving its goals to maximize waste reduction and recycling, as outlined in the current State Solid Waste Management Plan, "Beyond Waste".

The passing and implementation of the Act have engendered great enthusiasm and, as expected with any new legislation, some uncertainty. Many policy experts consider the Act to be one of the most comprehensive and progressive e-waste laws in the country.

This report is being submitted to the Governor and the Legislature pursuant to ECL §27-2617(4), and is intended to provide an update on the Act's implementation, an evaluation of its progress, an outline of the program's strengths and challenges, and recommendations for future improvements.

Product stewardship laws are intended to ensure that all those involved in the lifecycle of a product (e.g., manufacturers, retailers, recyclers, and consumers), share responsibility for reducing the health and environmental impacts that result from the production, use and end-of-life management of the product. Under product stewardship laws, manufacturers bear the primary financial responsibility for recycling programs, which have historically been managed and paid for by local governments at the expense of taxpayers. Product stewardship laws help reduce the financial burden on municipalities and often internalize end-of-life management costs in the cost of the product.

> To assure adequate service to the consumers of the state and improve e-waste collection, `11recycling and reuse, the Act includes three primary product stewardship elements: convenience requirements; performance standards; and environmental standards. These elements, along with a broad scope of covered products, help divert thousands of pounds of e-waste from landfills and waste combustion facilities; keep toxins such as lead, mercury and other hazardous materials from potentially contaminating the environment; and conserve natural resources by allowing valuable materials to be reclaimed and reused, rather than extracting virgin materials.

The Act, which took full effect on April 1, 2011, requires manufacturers who sell or offer for sale covered electronic equipment (CEE) (i.e., computers, computer peripherals, televisions, cathode ray tubes, small scale servers and small electronic equipment) in the state to register their brands of CEE with the Department, and acting individually or collectively through collective electronic waste acceptance programs (collectives), establish a convenient acceptance program for the collection, handling, and recycling or reuse of e-waste, free of charge to most consumers. Because of the Act, New York consumers now have more convenient opportunities to recycle their unwanted electronic equipment.

In addition to having established convenience requirements, the Act establishes annual Statewide Recycling and Reuse performance goals for e-waste, and requires manufacturers to collect and recycle their fair share of e-waste that is generated, based on their market share of CEE sold in New York State. Manufacturers that do not meet their annual Department-issued recycling acceptance standards are required to pay recycling surcharges for the prior year. This provision of the Act went into effect in program year 2013. Manufacturers that collect and recycle more than their acceptance standards were

allowed to begin accruing recycling credits in 2014, for use beginning in program year 2015. These credits can be banked, sold to other manufacturers, or used by the manufacturer to offset up to a 25 percent shortfall in the subsequent three years.

The Act also establishes a phased-in disposal ban for covered e-waste materials, which began on April 1, 2011 for manufacturers, retailers, operators of collection sites and consolidation and recycling facilities, and a complete disposal ban for all entities, including individuals and households, began on January 1, 2015. Therefore, as of January 1, 2015, individuals and households are no longer able to dispose of any e-waste covered by the law in a landfill or waste-to-energy facility, or place e-waste in any collection that is intended to result in disposal at such facilities.

The Department is tasked with oversight of the Act's implementation and its many requirements. The Department receives, processes and reviews all registrations, fee payments, annual report data and additional information from hundreds of the Act's regulated entities. The Department uses sales and market share data reported by manufacturers to calculate and allocate responsibility for the collection and recycling of e-waste among manufacturers of CEE to meet the Statewide Recycling and Reuse Goal. The Department is also required to provide enforcement, develop data management systems to track sales of CEE and e-waste being collected and recycled, and impose surcharges or award credits when appropriate.

A key element for effective program implementation involves a comprehensive education program that targets not only the public, but the manufacturers, the collection facilities and the communities affected by the Department's e-waste program. To that end, the Department created a website located at: **http://www.dec.ny.gov/chemical/65583.html**, where pertinent information and guidance are provided, including a list of all registered CEE manufacturers' brands and important information for consumers on how to recycle their e-waste easily through the various manufacturers' acceptance programs, with links to interactive lists and maps. Specific stakeholder guidance documents, as well as all registration, fee, and annual reporting forms are also available through this website.

Results reported for the first (partial) program year (9 months, from April 1, 2011 – December 31, 2011) were very encouraging. Manufacturers not only met the 2011 Statewide Recycling and Reuse Goal of e-waste collected for recycling or reuse of nearly 44,000,000 pounds, but exceeded the goal by slightly more than 850,000 pounds. Nearly 75 percent of the manufacturers met or exceeded their individual acceptance standards. By the end of the first program year, the Department received, reviewed and processed registrations and fees from 77 CEE manufacturers (39 individual manufacturers and 38 manufacturers participating in collective organizations), 6 collective organizations, 42 consolidation facilities, 47 recycling facilities and 726 collection sites.

Results reported for the second program year (January 1, 2012 – December 31, 2012) were slightly below the statewide goal, but still a significant improvement over years prior to the Act. Manufacturers were roughly 368,000 pounds short of meeting the 2012 Statewide Recycling and Reuse Goal of approximately 77,861,000 pounds. However, over 80 percent of the manufacturers reported either meeting or exceeding their individual acceptance standards, a slight increase over the prior program year. Beginning in 2014, manufacturers who exceeded their acceptance standards are allowed to accrue credits for over-collection for use beginning in 2015. For the second program year, 11 manufacturers did not meet their individual acceptance standards and were issued recycling surcharges totaling $786,530.30 for under-collection of 1,579,728 pounds. By the end of the second program year, the Department received, reviewed and processed registrations and fees from a total of 86 CEE manufacturers (42 individual manufacturers and 44 manufacturers participating in collective organizations), 7 collective organizations, 57 consolidation facilities, 62 recycling facilities and 1,105 collection sites.

There were notable accomplishments in the first two program years of this comprehensive product stewardship law. However, several challenges exist. As the program continues to mature, the Department is focused on working with all stakeholders to address these program challenges in order to achieve the most efficient, fair, and sustainable e-waste recycling program possible.

III. E-waste: A Growing Portion of Our Solid Waste Stream

In recent years, advances in consumer electronics and personal computers have spurred industry growth, changed information technology and improved people's lives in countless ways. But our growing dependence on electronic products both at home and in the workplace has given rise to a new potential environmental hazard: consumer e-waste. With lower prices and rapidly changing technology, computers, phones and TVs, as well as other electronic equipment, now have very short life spans. Accelerating trends in technology, in conjunction with the recent digital conversion, have resulted in a deluge of e-waste, giving it the notorious distinction of being the fastest-growing component of municipal solid waste. In addition, e-waste contains hazardous components that make the end-of-life management of these products complicated and, in some cases, expensive.

E-waste shows a higher growth rate than any other category of municipal solid waste, according to the United States Environmental Protection Agency (EPA). Nationwide, only 13.6 percent of the consumer electronic products entering the municipal solid waste stream were recovered for recycling in 2008. This compares to an overall recovery rate of 33.2 percent for all categories of municipal solid waste in 2008. A total of 430,000 tons of electronics were recovered in 2008. In 2009, the U.S. generated 3.19 million tons of e-waste, but only 600,000 tons or 17.7 percent was recycled, according to the EPA (up from 13.6 percent in 2008). Overall, between 2007 and 2008, total volumes of municipal solid waste decreased, while e-waste volumes continued to increase, putting more and more strain on local municipal budgets trying to handle the increasing volumes of e-waste generated.

The increasing rate of growth of e-waste and the environmental and fiscal problems associated with this growing component of our waste stream prompted 25 states, including New York, to pass e-waste legislation requiring manufacturers to provide programs to take back electronic equipment for reuse and recycling. Due to the states' e-waste legislation and expanded efforts of federal, state and local agencies, the recycling rate for e-waste is steadily increasing as more states are mandating product stewardship programs for selected electronic equipment. New York State's Act also bans disposal of e-waste in a solid waste disposal facility by anyone except an individual, starting January 1, 2012. The Act imposes a complete ban of e-waste disposal in any solid waste disposal facility, starting January 1, 2015.

Manufacturers of the following types of covered electronic equipment (CEE) must provide convenient electronic waste acceptance programs to NYS consumers:

- **Computers** (e.g. desktops, laptops, tablets and e-readers)
- **Televisions**
- **Small scale servers**
- **Computer peripherals** (e.g. monitors, keyboards, mice, fax machines, scanners and small printers)
- **Small electronic equipment** (e.g. VCRs, DVRs, portable digital music players, DVD players, digital converter boxes, cable or satellite receivers, video game consoles)

Many electronic products also contain valuable materials, such as precious metals (e.g., gold, silver, palladium, and copper), and engineered plastics, all of which require considerable energy to process and manufacture. Recycling the products can recover these valuable materials and help to offset demand for natural resources. Therefore, these product stewardship programs have the net beneficial effect of reduced greenhouse gas emissions, reduced pollution and decreased energy demand by extracting fewer raw materials from the Earth. In addition, recycling and reuse of these products saves valuable landfill space and reduces waste-to-energy emissions.

IV. Overview of the Act's Regulated Entities and their Responsibilities

Manufacturers of Covered Electronic Equipment

A manufacturer under the Act is an entity who assembles or substantially assembles CEE under its own brand name or under any other brand name for sale in New York; licenses a brand name to another person for use on CEE sold in the state; or imports CEE for sale into the state. However, entities that assemble or substantially assemble, and sell less than 1,000 units of CEE annually in the state are not considered manufacturers under the Act. Additionally, entities whose primary business is the sale of CEE which is comprised primarily of rebuilt, refurbished or used components, are also not considered manufacturers under the Act.

Manufacturers are responsible for implementing and maintaining an e-waste acceptance program, with oversight by the Department. The Act sets a statewide recycling or reuse goal and requires manufacturers, through their acceptance programs, to recycle or reuse their portion of that statewide recycling or reuse goal. A manufacturer's portion of the statewide goal is referred to as its acceptance standard, and is determined by the Department based on the manufacturer's market share of CEE sold into the state.

- **Statewide Recycling or Reuse Goal**

  Each year, manufacturers of CEE who sell into New York State are responsible for recycling or sending for reuse a portion of that program year's statewide recycling or reuse goal ("Statewide Goal"). This goal fluctuates annually based on the current state population, as well as a fixed per capita collection standard (set in statute for program years 2011 through 2013) or the amount of e-waste collected for recycling or reuse in prior years (for program year 2014 and annually thereafter).

  In 2011, the Statewide Goal was the product of the latest population estimate for the state, multiplied by three pounds, multiplied by three-quarters (for the abbreviated program period of April 1, 2011 through December 31, 2011), or **43,968,269 lbs.** For 2012, the Statewide Goal was **77,860,788 lbs.** based on 4 pounds per capita, and for 2013, was **97,851,305 lbs.** based on 5 pounds per capita.

  For 2014 and annually thereafter, the Statewide Goal is the product of the "base weight" multiplied by the "goal attainment percentage." The base weight is the greater of: (1) The average weight of all electronic waste collected for recycling or reuse during the previous three calendar years reported to the Department by a particular manufacturer; or (2) The three-year statewide average of all electronic waste collected for recycling or reuse during the previous three calendar years based on information reported to the Department by electronic waste collection sites, consolidation facilities and recycling facilities. The goal attainment percentage is 90-110 percent of the statewide recycling or reuse goal for the previous calendar year, depending on how the base weight compares to the Statewide Goal. Beginning in 2014 and each year thereafter, the Statewide Goal is calculated using the data from all registered entities' annual reports, which are due by March 1st each year. The submission of complete and timely annual reports to the Department is critical in order to calculate an accurate and equitable Statewide Goal. The formula for calculating the Statewide Goal for 2014 and beyond is essentially a sliding scale that will fluctuate based on the average weight of e-waste collected for recycling or reuse during the previous three calendar years as reported to the Department.

- **Acceptance Standards**

  Beginning with the 2011 program year, and annually thereafter, each manufacturer is required to accept for collection, handling and recycling or reuse, at a minimum, its acceptance standard of e-waste. However, manufacturers or their designee(s) may not stop collection of CEE once their acceptance standards have been met. E-waste acceptance programs must be run continuously throughout the program year.

A manufacturer's acceptance standard is determined by multiplying a program year's statewide recycling or reuse goal, as described above, by the manufacturer's market share of e-waste. A manufacturer's market share of e-waste is calculated by dividing the total weight of the manufacturer's CEE sold in the state (based on its average annual sales provided to the Department during the preceding three calendar years) by the total weight of all registered manufacturers' CEE sold in the state (based on the average annual sales during the preceding three calendar years).

Beginning in calendar year 2013, any manufacturer that fails to meet its acceptance standard for the previous calendar year is subject to a recycling surcharge. Beginning with calendar year 2014, a manufacturer that accepts more than its acceptance standard, may accrue and bank the excess weight as e-waste acceptance credits. These credits may be sold, traded, or banked beginning in calendar year 2015, for a period no longer than three calendar years following the year in which the credits were earned; but no more than 25% of a manufacturer's obligation for any calendar year may be met with recycling credits generated in a prior calendar year.

Manufacturer Acceptance Standard Example Calculation

Manufacturer's Market Share of CEE = Total weight of manufacturer's CEE sold in the state based on the average annual retail sales during the preceding 3 calendar years / Total weight of **all** manufacturer's CEE sold in the state based on the average annual retail sales during the preceding 3 calendar years = **100,000 lbs. / 1,000,000 lbs.** = **10%**

Manufacturer's Acceptance Standard = Statewide Recycling or Reuse Goal **X** Manufacturer's Market Share of CEE = **100,000,000 X 10%** = **10 million lbs.**

Additional important requirements for manufacturers under the Act include:

- **Registration with the Department**

Manufacturers are required to submit a registration form, a one-time $5,000 registration fee, and a fee form to the Department. A description of the manufacturer's e-waste acceptance program, prior sales data, and manufacturer brands must be included in the registration form, and must be updated within thirty days of any material change to the information provided.

- **Provision of a "Free and Convenient" Acceptance Program**

The manufacturer's e-waste acceptance program must be provided at no cost to most New York State consumers. For purposes of the Act, a consumer is an individual, business, corporation, limited partnership, not-for-profit corporation, the state, a public corporation, public school, school district, private or parochial school or board of cooperative educational services or governmental entity located in the state. While all of these consumers are entitled to convenient recycling, manufacturers are only allowed to charge consumers in the following instances: if a contract for services was in place prior to January 1, 2011; if the consumer is a for-profit entity with 50 or more full-time employees (FTEs) or a not-for-profit entity with 75 or more FTEs; or if a premium service is provided. Premium services are any services above and beyond the reasonably convenient acceptance methods defined in the Act.

Manufacturers must provide at least one reasonably convenient method of collection within each county and within each municipality of the state with a population of 10,000 or greater. A list of such counties and municipalities is available on the Department's website at: **http://www.dec.ny.gov/docs/materials_minerals_pdf/munipop10k.pdf**. The following collection methods are considered reasonably convenient under the Act: mail or ship back return programs; collection or acceptance events conducted by the manufacturer or the manufacturer's agent or designee, including events conducted through local governments or private parties; fixed acceptance locations such as dedicated acceptance sites operated by the manufacturer or its agent or designee; agreements with local governments, retail stores, sales outlets and not-for-profit organizations which have agreed to provide facilities for the collection of e-waste; community collection events; and any

combination of these or other acceptance methods that effectively provide for the acceptance of e-waste for recycling or reuse through means that are available and reasonably convenient to consumers in the state.

Through its acceptance program, the manufacturer must have the means to continually and conveniently collect, at no charge, not only its own brands of CEE, but also one piece of e-waste of any manufacturer's brand, if offered by a consumer, with the purchase of CEE of the same type by a consumer.

- **Provision of a Public Education Program**

  Manufacturers must provide a public education program to inform consumers about the manufacturer's e-waste acceptance program, and must provide sufficient information to enable a consumer to return CEE for recycling or reuse. At a minimum, the public education program must include a public education program website, a toll-free telephone number, and written information provided to consumers on how they may return CEE for recycling or reuse.

- **Retailer Notification**

  Each manufacturer must notify retailers that it is registered with the Department. If written information regarding the manufacturer's e-waste acceptance program is not included in the manufacturer's product manual for CEE, then the manufacturer must provide information on its e-waste acceptance program to retailers for distribution to consumers purchasing CEE.

- **Proper Labeling of CEE**

  A manufacturer may not offer for sale in the state or deliver to retailers for subsequent sale CEE unless it has a visible, permanent label clearly identifying the manufacturer of that equipment.

- **Annual Report Submission**

  Manufacturers are required to submit an annual report, a $3,000 annual reporting fee, and a fee form to the Department for the preceding program year. Details on the performance of the manufacturer's e-waste acceptance program, collection totals, prior years' sales data, updated manufacturer contact information, and other important facts and figures, are included in the annual report.

- **Records Maintenance**

  Manufacturers must maintain records demonstrating compliance with the Act, and make them available for audit and inspection by the Department for a period of three years.

- **Disposal Ban Compliance**

  The disposal ban of CEE for manufacturers began April 1, 2011.

Collective Electronic Waste Acceptance Programs

The Act enables manufacturers of CEE to meet their obligations through individual or collective electronic waste acceptance programs (collectives). A collective program must fulfill the same requirements as an individual manufacturer's e-waste acceptance program. While not specifically defined in the Act, a collective represents one or more manufacturers, for the purpose of satisfying their e-waste collection requirements. A collective program is often more efficient, and allows for cooperative effort among the manufacturers and their representative organizations to meet their obligations under the Act. Collectives must submit a registration form, and a one-time $10,000 registration fee and fee form to the Department, which is separate from their participating manufacturers' required submissions. Manufacturers who are a part of a collective still have the responsibility to meet all of their individual obligations, including the submission of an annual report, and a $3,000 annual reporting fee and fee form. However, manufacturers who register with the Department as participating in a collective from the beginning, are not required to submit an individual $5,000 registration fee or fee form.

Electronic Waste Collection Sites

E-waste collection sites (collection sites) are likely to be the first point of contact when consumers return their e-waste for recycling or reuse and, therefore, play an important role in the Act. A collection site is a fixed or temporary site (and may be either private or municipal) at which e-waste is collected from consumers and temporarily stored for more than five days in a calendar year before such waste is transported to an e-waste consolidation facility or e-waste recycling facility. Collection sites include, but are not limited to, dedicated sites and facilities for the acceptance of e-waste, retail stores and outlets, municipal or private e-waste collection sites and not-for-profit donation sites that have agreed to accept e-waste.

All collection sites, including municipal collection locations, are required to submit a one-time registration form to the Department at least thirty days prior to receiving any e-waste at the site. Collection sites must also submit an annual report by March 1st for the previous program year detailing collection totals of CEE accepted at the site. E-waste must be properly stored and removed from the site in a timely manner.

Electronic Waste Consolidation Facilities

Electronic waste consolidation facilities (consolidation facilities) organize, categorize and/or consolidate e-waste before it is transported to a recycling facility or other consolidation facility. Consolidation facilities include, but are not limited to, facilities of brokers acting as intermediaries between e-waste buyers and sellers, and regional centers at which e-waste is organized, categorized or consolidated after being transported to such centers from consumers, collection sites or other consolidation facilities.

Consolidation facilities must fulfill the same requirements as described above for collection sites. In addition to the registration form, consolidation facilities must also submit a one-time registration fee of $250 along with a fee form to the Department.

Electronic Waste Recycling Facilities

The Act defines e-waste recycling facilities (recycling facilities) simply as facilities at which e-waste is recycled. Recycling means to separate, dismantle or process the materials, components or commodities contained in e-waste for the purpose of preparing the materials, components or commodities for use or reuse in new products or components thereof, but not for energy recovery or energy generation by means of combustion, gasification, pyrolysis or other means. Recycling includes the manual and mechanical separation of e-waste to recover materials, components or commodities contained therein for the purpose of reuse or recycling, and changing the physical or chemical composition of e-waste.

The importance of information provided to the Department by recycling facilities is immeasurable. Recycling facilities are often the first point at which e-waste collected for recycling is weighed and quantified, so it is critical that their information is accurate and readily available to those collection sites, consolidation facilities, manufacturers and collectives with which the recycling facility contracts or on behalf of which it operates. Recycling facilities must fulfill the same requirements as described above for a consolidation facility.

Retailers

Retailers play an important gate-keeping function under the Act as they are only allowed to sell registered manufacturer brands – specifically, brands of those manufacturers that are currently registered and are in compliance with the requirements of the Act. Retailers are prohibited from selling unregistered brands of CEE, as well as CEE that has been improperly labeled by the manufacturer. The Department maintains an updated list of registered brands of CEE on its public website for the retailers' information. At the point of sale, retailers must provide purchasers of CEE with information about opportunities for the convenient return of e-waste if it has been provided to the retailer by the manufacturer for dissemination.

Waste Management Facilities & Waste Haulers/Transporters

Solid and Hazardous Waste Management Facilities and Waste Haulers and Transporters play an important role in ensuring the success of the Act's disposal ban. The Act's disposal ban prohibits e-waste from being accepted for disposal at a solid or hazardous waste management facility in three phases: April 1, 2011, from any electronic equipment manufacturer, retailer, or owner or operator of an e-waste collection site, consolidation facility, or recycling facility; January 1, 2012, from any person other than an individual, or household consumer; and January 1, 2015, from any person. Owners or operators of solid or hazardous waste management facilities are required to educate users of such facilities on the proper methods for recycling e-waste, providing both written information and posting signage at the facility. The Act also requires persons engaged in the collection of solid waste for delivery (i.e., private or municipal solid waste haulers/transporters), to educate their users in the form of written information, on the proper methods for recycling e-waste.

Department's Oversight Role

The Department is charged with implementing, administering and enforcing the provisions of the Act. As such, the Department is responsible for overseeing a comprehensive system for managing the rapidly growing amount of e-waste across the state. The Department is required to:

- Collect, process, analyze, track and summarize information required by the Act;
- Calculate and allocate responsibility for the collection of e-waste among manufacturers of CEE;
- Maintain and post on its website a list of registered manufacturers and collective electronic waste acceptance programs, links to their public education program webpages, and all forms necessary for the regulated community to comply with the Act;
- Promulgate rules and regulations necessary to implement, administer and enforce the Act;
- Promulgate rules and regulations on standards for reuse, e-waste acceptance credits, waivers of recycling surcharges, and acceptable alternative methods for determination of sales data;
- Register and maintain a list of manufacturers which are registered and their brands, in addition to publishing such list on the Department's website;
- Register all e-waste collection, consolidation and recycling facilities within New York State;
- Provide technical support and outreach, as well as disseminate information to all interested parties;
- Collect, analyze and evaluate information contained in registrations and annual reports, including manufacturers' sales data and e-waste collection data;
- Maintain a database of annual collections, waste credits and credit transactions;
- Process registration fees, annual reporting fees, and surcharge payments;
- Calculate recycling surcharges and track acceptance credits;
- Evaluate requests for waivers of recycling surcharges;
- Track compliance and enforcement; and,
- Submit a report to the Governor and Legislature biennially, which evaluates the e-waste stream in the state; evaluates the rate of recycling and reuse in the state of CEE; discusses compliance; recommends any changes; and discusses opportunities for business development in the state related to this program.

Department Website Quick Links:

- NYS E-waste Recycling Program Main Page: **http://www.dec.ny.gov/chemical/65583.html**
- Guidance for Consumers: **http://www.dec.ny.gov/chemical/66872.html**
- Registered Manufacturers & their Brands: **http://www.dec.ny.gov/chemical/82084.html**
- Text of the NYS Electronic Equipment Recycling & Reuse Act: **http://www.dec.ny.gov/docs/materials_minerals_pdf/ewastelaw2.pdf**

V. Program Performance and Results

Overall Collection Results

The NYS Electronic Recycling and Reuse Act has proven to deliver both positive environmental and economic results in 2011 and 2012. The total amount of CEE collected by manufacturers for recycling or reuse during the 2011 reporting period (April 1, 2011 – December 31, 2011) was 44,818,426 lbs., which equates to an approximate 2.3 lbs. per capita statewide collection rate. Manufacturers successfully collected 850,157 lbs. more from NYS consumers than was required by the 2011 Statewide Recycling and Reuse Goal of 43,968,269 lbs.

During calendar year 2012, the total amount of CEE collected by manufacturers for recycling or reuse increased to 77,492,596 lbs., which equates to an approximate 4 lbs. per capita statewide collection rate. However, manufacturers ultimately reported collecting 368,192 lbs. less from NYS consumers than was required by the 2012 Statewide Recycling and Reuse Goal of 77,860,788 lbs.

Significantly more e-waste was collected for recycling or reuse from NYS consumers in 2011 and in 2012 than in any previous year for which records are available. According to the limited historical data available to the Department, approximately 6,481,446 lbs. of e-waste was collected from household hazardous waste (HHW) collection events and permanent HHW sites in 2010. This amount does not account for other potential e-waste collected by any other voluntary methods.

2011

- Statewide Recycling and Reuse Goal: **43,968,269 lbs.**
- Manufacturing reported collecting: **44,818,426 lbs.**
- That's an excess of: **850,157 lbs.**
- **2.3 lbs.** per capita

2012

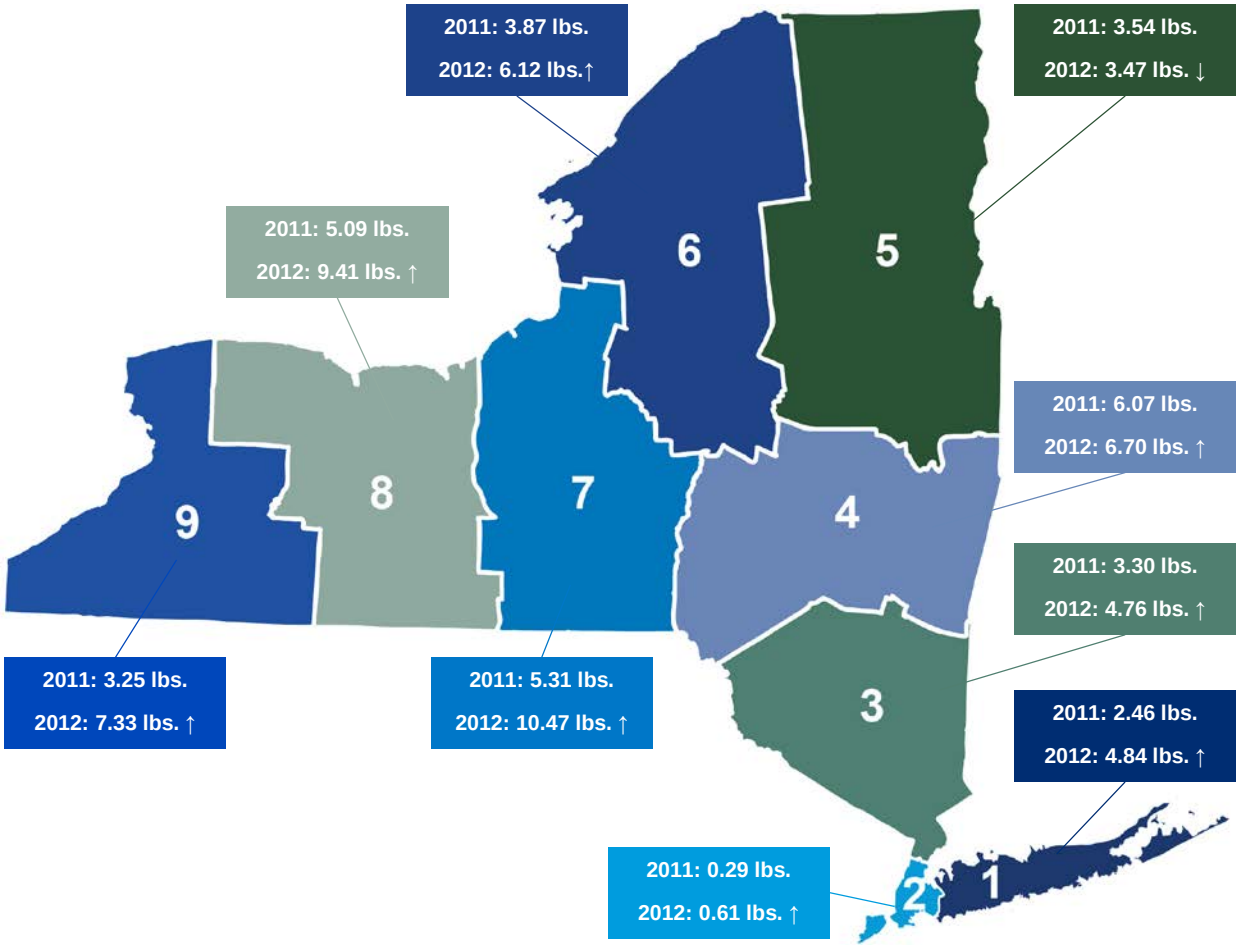
- Statewide Recycling and Reuse Goal: **77,860,788 lbs.**
- Manufacturing reported collecting: **77,492,596 lbs.**
- That's a shortfall of: **368,192 lbs.**
- **4 lbs.** per capita

Results by DEC Region

For the 2011 program year, only 40 percent of the e-waste collection sites that were registered submitted their required annual reports. Accordingly, the Department was only able to determine the origin of 29,482,416 lbs. of e-waste collected. Each county's percentage of the total weight that could be accounted for was then extrapolated to estimate the approximate per capita collection rates for the various DEC Regions for the 2011 program year based on the actual collection total of 44,818,426 lbs. (see diagram below). All regions of the state, aside from New York City (Region 2), met the 2.25 lbs. (3 lbs. multiplied by ¾ of a year) per capita statewide recycling or reuse goal for the 2011 program year. The New York City rate was far below the rate for the other Regions.

For the 2012 program year, approximately 75 percent of the e-waste collection sites reported. In addition, more detailed information was received from recycling facilities regarding the origin of e-waste collected via premium services such as on-site pickup. The Department was able to determine the origin of 61,134,927 lbs. of e-waste collected. Again, each county's percentage of the total weight that could be accounted for was then extrapolated to estimate the approximate per capita collection rates for the various DEC Regions for the 2012 program year based on the actual collection total of 77,492,596 lbs. (see diagram below). All regions of the state, aside from New York City and rural Region 5 met the 4 lbs. per capita statewide recycling or reuse goal for the 2012 program year. Every region, except Region 5, increased its per capita collection rate for 2012 over the prior program year. The New York City rate continued to be far below the rate for the other Regions.

Per Capita Collection by DEC Region



Region 1: Nassau and Suffolk Counties

Region 2: Kings, Bronx, New York, Queens and Richmond Counties

Region 3: Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester Counties

Region 4: Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie Counties

Region 5: Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington Counties

Region 6: Herkimer, Jefferson, Lewis, Oneida and St. Lawrence Counties

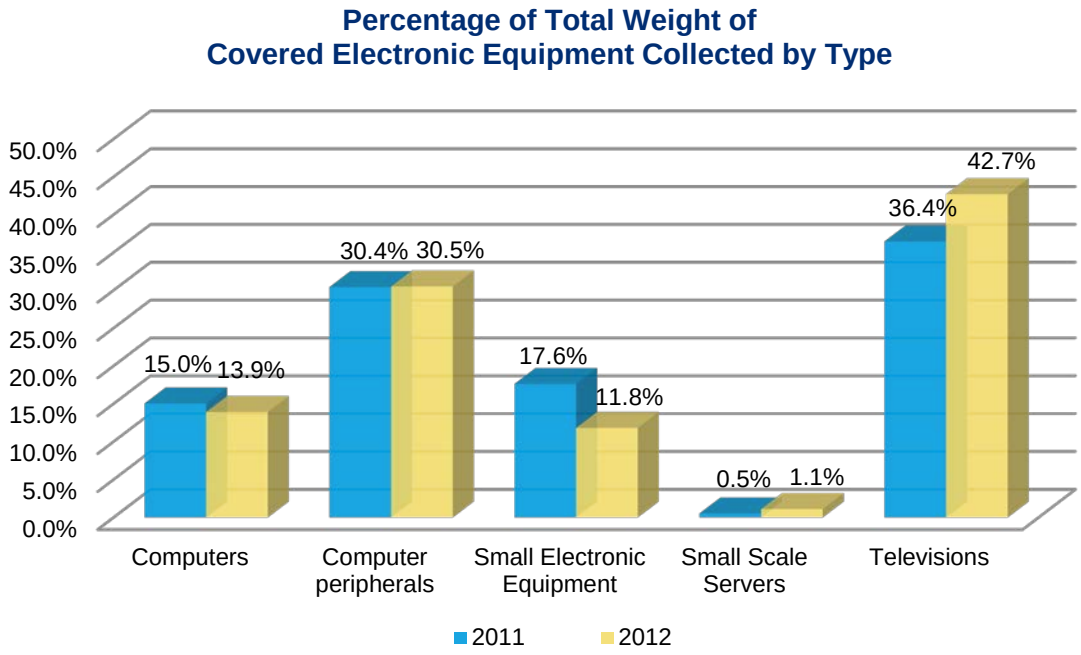
Region 7: Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga and Tompkins Counties

Region 8: Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne and Yates Counties

Region 9: Allegany, Chautauqua, Cattaraugus, Erie, Niagara and Wyoming Counties

Results by Type of Covered Electronic Equipment

Television and computer peripheral categories of CEE, which include both bulky Cathode Ray Tube (CRT) televisions and CRT monitors, comprised over two-thirds of the weight collected from consumers for the 2011 and 2012 reporting periods. There was a significant drop in the weight percentage accepted from consumers in the small electronic equipment category from 2011 to 2012, suggesting that either consumers are recycling less of this type of equipment or that the equipment itself is becoming lighter. The weight percentage accepted from consumers in the television category from 2011 to 2012, however, increased significantly, likely due to increased consumer demand for recycling or disposal of the more obsolete CRT televisions. For a full results breakdown by CEE category, see the graph below.

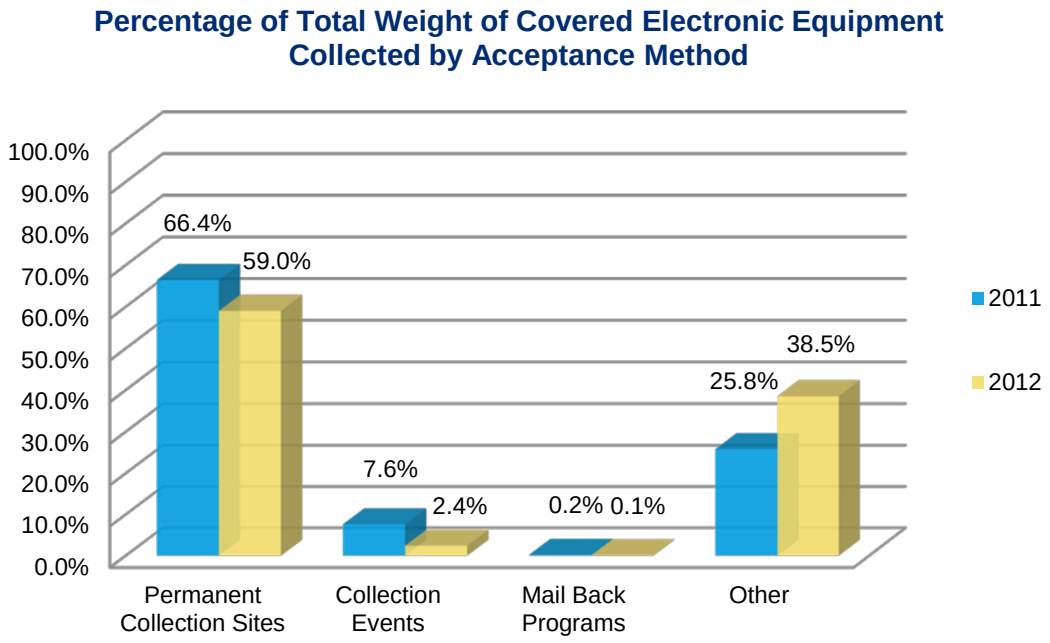


Results by Acceptance Method

The Act allows manufacturers of CEE to employ a variety of acceptance methods to meet the convenience requirements of the law. The following acceptance methods are considered reasonably convenient:

- **Mail or ship back return programs** that are free to the consumer and that do not exclude material based on weight limits (unless another reasonably convenient acceptance method has been provided);
- **Collection or acceptance events** conducted by the manufacturer or the manufacturer's agent or designee, including single and multiple-day events conducted by local governments, community groups or private parties;
- **Fixed acceptance locations** at dedicated acceptance sites operated by the manufacturer or its agent or designee, including local governments, retail stores, and not-for-profit organizations which have agreed to provide facilities for the collection of e-waste;
- **Other methods** which effectively provide for the acceptance of e-waste for recycling or reuse through means that are reasonably convenient to consumers in the state. Examples of “other methods” include premium services, such as reverse distribution/pick-ups of obsolete equipment at businesses, schools and government locations. In the program’s first and second year annual reports, several manufacturers reported purchasing significant quantities of e-waste from recycling facilities in an attempt to meet their acceptance standards. For these transactions, manufacturers failed to report the acceptance method used in the original collection. The weight of e-waste purchased from recycling facilities without further breakdown of origin, has been included in the “other” category for the 2011 and 2012 reporting periods.

Approximately two-thirds of the weight collected from consumers during the 2011 and 2012 reporting periods was collected at permanent collection sites. The results also show that the weight collected from permanent collection sites and collection events decreased from 2011 to 2012. Collection by mail back programs, which manufacturers used primarily to meet the Act's convenience requirements, represented less than a quarter of one percent of the total weight collected for both program years. It is important to note that a significant amount of e-waste in 2011 and 2012 fell into the "other" acceptance category, which accounts for weight that may have been simply collected directly from various business entities, outside the collection site infrastructure. For the full results breakdown by acceptance method, see the table below.



Registration & Annual Reporting Process

During the first two program years, the Department received numerous registrations and annual reports from the Act's regulated entities, as detailed in the chart below. By the end of 2011, the NYS E-waste Program had a total of 851 registered entities, due to registrant category adjustments and program drop-outs. By the end of 2012, there were 1,255 registered entities, after similar category adjustments and program drop-outs. Overall, compliance with the registered entities' annual reporting increased significantly from 2011 to 2012.

	Total Registrants		% Annual Reports Received	
Registrant Type	**2011**	**2012**	**2011**	**2012**
Collectives	6	7	100%	100%
Manufacturers	77	86	100%	94%
Individual	39	42		
Collective	38	44		
Collection Sites	726	1,105	40%	75%
Consolidation Facilities	42	57	70%	100%
Recycling Facilities	47	62	78%	94%

Many of the Act's regulated entities are required to pay a one-time registration fee depending upon the type of operations they perform. Collective electronic waste acceptance programs are required to pay $10,000 at the time of registration; manufacturers running individual e-waste acceptance programs are required to pay $5,000; and e-waste recycling and consolidation facilities are required to pay $250. All manufacturers are required to pay an annual reporting fee of $3,000 with their March 1st annual reports. Revenue from the first two program years, which was deposited into the Environmental Protection Fund, totaled **$800,000**, and broke down as follows:

	2011	2012
Registration Fees	**$297,000**	**$29,000**
Collectives	$60,000	$10,000
Manufacturers	$215,000	$10,000
Recyclers	$11,000	$4,000
Consolidators	$11,000	$5,000
Annual Report Fees	**$240,000**	**$234,000**
TOTAL	**$537,000**	**$263,000**

Collective Electronic Waste Acceptance Programs

Six collective programs operated in NYS during the first program year, and seven in the second. These collectives have proven to be an efficient and cost-effective option for many manufacturers, especially the smaller manufacturers, who may not have the resources available to implement and maintain their own statewide e-waste acceptance and public education programs. While about half of manufacturers who registered in 2011 joined collective programs, many manufacturers who originally opted to run their own individual acceptance programs have now switched to collectives in order to meet their increased acceptance standards. In fact, over 70 percent of manufacturers now report participating in collective programs. Collectives have some of the largest recycling infrastructure in the state, providing consumers with numerous physical collection locations in addition to the rarely used mail back programs.

Manufacturer Performance

While all annual reports for the 2011 program year were eventually received from manufacturers, many were submitted well into May, significantly beyond the March 1, 2012 reporting deadline. For program year 2012, manufacturers' annual reporting compliance decreased, as annual reports from five manufacturers were never received despite several reminders. In addition, many of the 2012 program year annual reports did not arrive until several months after the reporting submission deadline. This resulted in a delay in manufacturers' acceptance standard calculations and distribution of that information to manufacturers.

For program year 2011, 73.5 percent of manufacturers reported either having met or exceeded their manufacturer acceptance standards, while 26.5 percent reported having not met their acceptance standards. Of the manufacturers who reported for program year 2012, 80.2 percent reported either having met or exceeded their manufacturer acceptance standards, while 19.8 percent reported having not met their acceptance standards. The increased compliance of manufacturers with their acceptance standards for the second program year was likely due, at least in part, to the onset of recycling surcharges beginning in 2013 for shortfalls occurring in program year 2012. Recycling surcharge results are described in the following section.

In their initial registration forms and/or subsequent updates, all manufacturers listed a mail back program as one of their free and convenient acceptance methods to be provided to NYS consumers. However, for program year 2011, only about half of those who reported claimed to have collected any weight via this acceptance method, and for program year 2012, the number of those who reported accepting any weight via mail back dropped dramatically to less than 14 percent. In both program years, of those who reported receiving e-waste via a mail back program, only an exceptionally small fraction (less than 0.25 percent) of their total weight of CEE collected actually resulted from their mail back program. This is likely due to ineffective manufacturer public education programs and low consumer usage because of the inconvenience of mailing back large CEE. The majority of consumers use mail back for small CEE, and not bulky televisions and computers. It is usually preferable to a consumer to bring a large item to a drop-off location, which may or may not be conveniently located to them, than to have to prepare and package a large item and schedule a pick-up or bring the item to a mailing location. Mail back programs, in the first few program years, have been ineffective and are mostly used by manufacturers to meet the Act's convenience requirements. These programs may improve for smaller CEE with more outreach efforts on the part of manufacturers.

Manufacturer Recycling Surcharges

Beginning in 2013, and annually thereafter, a manufacturer that fails to meets its manufacturer's acceptance standard of e-waste for the previous calendar year is subject to a recycling surcharge of $0.30, $0.40 or $0.50 per pound, depending on how far a manufacturer is from meeting its acceptance standard.

Recycling Surcharge Calculation

A manufacturer's surcharge is calculated by multiplying the following rate by the number of additional lbs. the manufacturer should have collected/recycled towards its acceptance standard:

Rate, if manufacturer collected:

< 50% of acceptance standard = **$0.50 per lb.**

50% to <90% of acceptance standard = **$0.40 per lb.**

90% to <100% of acceptance standard = **$0.30 per lb.**

In rare cases, the Department may waive the recycling surcharge payable by a manufacturer when the manufacturer demonstrates in an application to the Department that it was unable to accept its acceptance standard of e-waste despite the manufacturer's best efforts. A waiver does not relieve a manufacturer of the obligation to comply with all other provisions of the Act. Waiver applications are to accompany the manufacturer's annual report and annual reporting fee due March 1st annually. For program year 2012 the Department received no waiver applications.

For program year 2012, recycling surcharges totaling $41,922.30 for under-collection of 90,512 lbs. were collected from 10 manufacturers. Going forward, the Department anticipates increased compliance by manufacturers in meeting and exceeding their acceptance standard performance goals.

Electronic Waste Collection Sites

At the end of 2011, there were approximately 726 e-waste collection sites operating across the state. Approximately 54 percent of collection sites that operated in New York State during the first program years were located at retail outlets or other privately run locations (e.g., Best Buy, Good Will and Salvation Army). Municipally-run collection sites made up approximately 46 percent, with about half of those being located at solid waste transfer stations.

Municipal Cost Savings Example

Westchester County

- Municipality benefits from savings of over $75,000 per month after the April 1, 2011 implementation of the Act
- Westchester County now has minimal operational expenses related to the management of residential e-waste

Both private and municipal collection site locations significantly increased in number after the first program year to a total of 1,105 by the end of 2012. As the statewide recycling and reuse goal and manufacturer's acceptance standards increased in the first two program years, so did the number of pounds of e-waste required for collection and recycling. Collection site locations are proving to be one of the most convenient and frequently-used methods for consumers to dispose of their e-waste, and therefore, play a critical role in New York's e-waste recycling infrastructure.

Municipalities have no responsibility to collect e-waste under the Act. In fact, a key purpose of the Act was to remove the burden and expense of managing costly e-waste acceptance programs from municipalities, and introduce a producer responsibility approach to managing this expanding waste stream. Still, many municipalities chose to offer e-waste collection opportunities in their community and, in many cases, partnered with recyclers, manufacturers and/or collectives in offering such programs.

In the fall of 2012, the Department surveyed state municipal contacts asking them about their experiences before and during the Act's first program year. According to those 280 municipal contacts surveyed, the Act's first program year proved to be successful. In fact, 70 percent of those surveyed indicated their municipality faced no obstacles as a result of the Act. Of those who experienced difficulties during the Act's first program year, most cited a lack of public awareness of the Act and/or that the municipalities lacked guidance regarding the Act's implementation. The Department, along with municipal solid waste management facilities and waste haulers, plays an important role in ensuring the success of the Act, and it is clear that additional education and outreach activities to consumers are necessary.

The Department was also able to conclude from this survey that the Act has resulted in fewer fees to residents for the acceptance of their e-waste for recycling/reuse and in some cases provided for a small revenue stream for municipalities. Several municipalities noted significant savings for the management of e-waste after the adoption of the Act. Westchester County, for example, was able to save over $75,000 per month after the Act went into effect. In addition, the municipal e-waste collection infrastructure in the state has expanded and there are now more collection opportunities available to residents than before the Act's implementation date. The Department plans to perform a follow-up survey of municipal contacts in the near future to assess how the Act has affected municipalities beyond the first two program years.

Electronic Waste Recycling Facilities

By the end of 2011, there were 47 NYS-based e-waste recycling facilities operating across the state. By the end of 2012, the number had increased to 62. These recycling facilities play a critical role in the implementation and overall performance of the Act. Recycling facilities act as a very important bridge between the collection of e-waste for recycling through collection sites, and the distribution of the weight recycled to manufacturer and collective acceptance programs, helping them to meet their convenience and performance goals. The recycling community's assistance to manufacturers was critical in the establishment of programs able to meet manufacturers' convenience requirements and performance standards imposed by the Act. Many manufacturers partnered with recycling facilities that were well established and had attained, or were in the process of attaining, third-party certification (e.g., R2 and e-Stewards). It is important to note that the Act does not require third-party certification of its registered e-waste recycling facilities.

Recycling facilities have been very active in implementing various aspects of the Act, including:

- Disseminating information to collection sites and, in the process, providing educational opportunities on the Act's requirements;
- Logistics planning around the state in anticipation of increased e-waste flow;
- Greatly expanding the state's e-waste collection infrastructure by contracting with municipalities and private collection sites, as well as through direct collection from business consumers;
- Working extensively with manufacturers and collectives to secure agreements for participation in their acceptance programs; and
- Changing the way they traditionally track and report collection data to reflect the Act's explicit reporting requirements (e.g., weight by type of CEE and by location of origin).

Recycling facilities continue to implement successful operations despite facing significant challenges, including, but not limited to:

- Competition to gain contracts with manufacturers who not only dictate low reimbursement rates but also delay payments;

- Low overall consumer awareness regarding the state's e-waste recycling program, the Act itself, and available options for recycling or reuse of their equipment;
- Managing complex materials, which are labor intensive to responsibly handle and process;
- High cost of materials transportation;
- Limited outlets for CRT recycling;
- Difficult collection logistics, especially in the state's urban centers;
- Fluctuating commodity prices; and
- Competition to gain contracts with municipalities, schools, large businesses and other collection site locations who demand increasingly high prices for their e-waste.

E-waste Job Creation Survey for Recyclers

In the fall of 2012, the Department surveyed the state's registered e-waste recyclers to obtain important feedback and gauge overall economic impact of the Act during the first program year. The E-waste Job Creation Survey for Recyclers (survey), included questions regarding jobs, economic impact and recycler satisfaction. Results were as follows:

- 72 percent of the recyclers that responded reported positive impacts on their business.
- The majority of recyclers had positive overall views regarding the Act, calling it positive for consumers and the environment.
- 42 percent of the recyclers surveyed felt that the program favors large recyclers and tends to keep smaller recyclers and start-ups from benefiting from the economic opportunity.
- 42 percent also indicated paperwork, data and tracking requirements imposed by the Act were difficult to handle.
- Two thirds of the recyclers indicated that the new opportunities presented by the passing of the Act were the main reason for their entry into the e-waste recycling business.
- Prior to the Act's implementation, 50 percent of the recyclers reported hiring up to three new employees in anticipation of the demand created by the implementation of the Act.
- A third of the respondents indicated a slight increase in their workforce, while about six percent forecasted significant increases in hiring by the end of year 2012.

Department Activities Performed

The Department played an active role in developing and advocating for e-waste product stewardship legislation in New York before the Act's passage in May of 2010. Since the Act's passage, the Department has taken the lead role in the implementation and administration of the state's E-waste Recycling/Reuse Program. The following are examples of program activities that were performed by the Department before and during the Act's first two program years. In many cases these activities are ongoing:

- Registration, annual reporting and fee form development and revision for all regulated entities;
- Short-term data management system development and implementation;
- Registration and annual report data entry and verification;
- Registration and reporting fee payment processing;
- Manufacturer acceptance standard calculation and distribution via certified mail;
- Manufacturer surcharge calculation;
- Long-term data management system development with contractor;

- Providing technical support and determinations to regulated entities via telephone and e-mail;
- Targeting and contacting unregistered manufacturers of CEE as well as other regulated entities;
- Notifying retailers about unregistered manufacturers' brands;
- Performance of enforcement and compliance activities;
- Creation and maintenance of guidance information on the public website, including, but not limited to, lists of registered entities;
- Development of outreach and education materials for publication;
- Development and delivery of presentations on the Act;
- Development of draft rules;
- Acquisition of membership with, and participation in, various stakeholder organizations such as the Electronics Recycling and Coordination Clearinghouse, the State Electronics Challenge, the New York Product Stewardship Council (NYPSC), and the Product Stewardship Institute (PSI);
- Survey creation, distribution and analysis;
- Verification and manipulation of collection data for trend determination and reporting; and
- Development of this report to the Governor and Legislature.

VI. Program Strengths

Broad Scope of Covered Electronic Equipment

New York passed an e-waste recycling law with a very broad scope of covered electronic equipment, as compared to states with earlier e-waste laws. Most other states have a limited variety of affected products, typically only computers, monitors, laptops and sometimes televisions and printers. In general, the Department believes, consumers are more likely to participate in collection programs that allow them to bring back all of the e-waste they have for recycling, especially the larger items, including televisions and printers. Department staff continually evaluate emerging electronic products in order to make technical determinations for inclusion as CEE under the Act and add these products when appropriate. For example, the Act's general definition of "computer" has allowed for the addition of tablets and e-readers to be included as CEE in New York's program.

Increased Recycling/Reuse and the Resulting Benefits

As a result of the Act, approximately 123 million pounds of e-waste that might not have otherwise been removed from the municipal solid waste stream was properly recycled or reused during New York's first two program years. This proper management of e-waste, including the recycling and reuse of unwanted equipment pursuant to the Act resulted in an energy savings equivalent to powering approximately 102,432 U.S. households a year, and a greenhouse gas reduction equivalent to removing approximately 26,786 passenger cars from the road per year (Source: The Federal Electronics Challenge's "Electronics Environmental Benefits Calculator (EEBC)"). The increases in the statewide recycling or reuse goal, combined with increased consumer awareness and the continued expansion of manufacturers' recycling infrastructures over the next few years, will likely continue to increase the amount of e-waste collected. Increased collection of e-waste for recycling or reuse will save additional valuable landfill space, further protect human health and the environment from potentially toxic materials, and result in fewer natural resources used, among numerous other benefits.

Convenient Collection Available to All Consumers

In several states with existing e-waste recycling legislation, e-waste collection opportunities are only available to household consumers. In New York State, however, the Act expands its free and convenient acceptance requirements to small businesses, corporations, limited partnerships, not-for-profit corporations, the state, public corporations, public schools, school districts, private or parochial schools, boards of cooperative educational services (BOCES), and governmental entities. These non-household consumers are significant contributors of e-waste, and it was essential to include them in the broad scope of entities covered by the Act. It's important to note that while free acceptance methods are available to non-household consumers in the state, many choose more convenient "premium service" options provided by manufacturer programs, such as at-business pick-up, equipment and data security services, or specialized packaging. Charging a fee for these "premium service" options is allowed under the Act.

Year-Round Collection

New York State consumers have access to free and convenient recycling year round. Even after manufacturers meet their acceptance standard goals, CEE collection may not be halted by manufacturers. Through its acceptance program, a manufacturer must collect not only its own brands of e-waste, but also one piece of e-waste of any manufacturer's brand if offered by a consumer, with the purchase of CEE of the same type by a consumer. Such collection must continue all year long, allowing consumers the flexibility to offer their e-waste for recycling or reuse at a time that is most convenient for them.

Adjusting Statewide Goals

Statewide recycling and reuse goals are prescribed in the Act for the first three program years; however, in program years 2014 and beyond, the Act uses a specified formula by which the statewide recycling and reuse goal will fluctuate. Year-to-year statewide collection goals will increase or decrease based on actual collection in the three preceding calendar years as reported to the Department. This will ultimately result in manufacturers' acceptance standards more closely following changing market conditions and collection activities.

Statewide Recycling & Reuse Goals:

- 2011: 43,968,269 lbs.
- 2012: 77,860,788 lbs.
- 2013: 5.0 lbs./capita
- 2014 & beyond: formula used*

* For 2014 and beyond, the statewide goal will fluctuate based on market conditions and takes into account the average weight of e-waste collected for recycling during the previous three years.

Manufacturer Flexibility in Establishing Unique Collection Infrastructure

Under New York's Act, manufacturers have been given the flexibility to decide how they will reach their acceptance standard goals. They can utilize a number of acceptance methods deemed "reasonably convenient" under the Act, such as mail back, collection at permanent sites, and collection events. This flexibility has been well-received by regulated manufacturers and has led to improved cooperation on the part of manufacturers.

Less Financial Burden on Local Government

Prior to the Act's implementation, many local governments across the state that provided e-waste collection programs for their residents were forced to pay excessively high prices. In many cases, the prohibitive cost of managing e-waste collection programs deterred local governments from offering such programs. During the first two program years, participating municipalities reported that not only had the Act removed the heavy financial burden of providing e-waste collection programs from local governments, but it had also helped defray program costs and, in some cases, provided a modest revenue stream. It should be noted that the Department is not involved in the actual contract negotiations between regulated entities and that these costs will continue to fluctuate based on market conditions beyond the Department's control.

Job Growth in Recycling Industry

The majority of recyclers that staff surveyed had positive overall views regarding the Act's first two program years, calling it beneficial for consumers and the environment. Initial qualitative and quantitative data suggests that the Act has positively affected growth in the e-waste recycling industry, as mentioned in the discussion regarding the E-waste Job Creation Survey for Recyclers. Business expansion and job creation occurred in the first two program years and can be expected to continue in future years.

VII. Program Challenges

Stakeholder Awareness

Many of the Act's regulated entities were slow in learning the details and requirements of the Act, and, therefore, did not submit the required registration or annual reporting forms, incorrectly registered, provided incorrect, incomplete or inconsistent data, and/or did not submit required information in a timely manner. This, in turn, made it difficult for the Department to pass along timely information to appropriate stakeholders.

Adequate public education and outreach is a critical component in the success of any new recycling program. Educating all consumers across the state with a clear, concise message and arming them with easy-to-use information regarding the free and convenient recycling/reuse opportunities available to them is key to increasing e-waste recycling in the state.

Data Management, Tracking and Verification

The absence of an effective database management system has limited the Department's ability to accomplish some of the objectives of the program. With the large amount of data and information generated from program registrations, annual reports and stakeholder correspondence, the use of desktop spreadsheets has been quickly outgrown. The time and effort required to manually enter and verify quantities of e-waste moving through a system involving over 1,200 regulated entities has been difficult and has strained the Department's ability to adequately track e-waste. The need for a comprehensive database management system has become even more crucial to the success of the program now that the Department is required to track e-waste acceptance credits (see below, "IX. Looking Forward").

Out-of-State Entities

The Department has difficulty tracking and accounting for e-waste collected and processed by out-of-state entities that are not required to register in New York. Presently, only the collectors, consolidators and recyclers located in New York are required to register in the program. There are sizable amounts of e-waste pick-ups from businesses and private entities that escape the Department's out-of-state tracking capabilities. If this e-waste is not being claimed by manufacturers or collectives participating and reporting in New York's e-waste recycling program, there is currently no other mechanism by which the Department can account for this weight. This missing weight can make a difference in calculating the annual Statewide Recycling and Reuse Goal, using the prescribed formula beginning in the 2014 program year.

Delayed Acceptance Standard Allocation for Manufacturers

Annual reports from all registered manufacturers of CEE were due March 1, 2012 for the first program year (April 1, 2011 – December 31, 2011). The Department could not accurately calculate and fairly assign 2012 acceptance standards for e-waste to manufacturers until annual reports from all registered manufacturers of CEE, with updated sales information, were received, processed and reviewed. The Department was still receiving manufacturer reports for the 2011 program year well into May of 2012. For the second program year (January 1, 2012 – December 31, 2012), the Department again received late manufacturer annual reports well past the March 1, 2013 deadline, despite multiple reminder attempts.

The untimely submission of complete annual reports by manufacturers and collectives in both program years led to a significant delay in the allocation of acceptance standards, which were not officially sent out until June. The Department anticipates more prompt submission of annual reports in future program years, but enforcement actions may be necessary to ensure compliance.

Program Implementation and Effectiveness in New York City

E-waste collection and recycling in New York City poses a unique challenge. Approximately 40 percent of the state's population lives in New York City. Due to the nature of housing and transportation within New York City, it is a daunting task to make e-waste collection and recycling conveniently available to over eight million residents through a small number of permanent collection centers and a few collection events held each year. In the first two program years, there was a significant under-collection of e-waste as reported by the various program stakeholders, despite the City's best efforts to disseminate information regarding e-waste collection opportunities and sponsoring one collection event in each of its five boroughs annually. Despite this not being the specific responsibility of New York City under the Act, the New York City Department of Sanitation (DSNY) recognized the need to develop an enhanced e-waste collection for City residents and began the development of a much more expansive and comprehensive program that will provide more convenient options for e-waste recycling/reuse within the City.

Recycling Cathode Ray Tubes (CRTs)

Consumers in New York State, like every other state in the country, have embraced new technologies that are shifting away from CRT display units. This has resulted in a glut of these older, heavy units available for collection, recycling and processing. CRTs contain significant quantities of lead and properly managing the resultant contaminated glass has become a challenging task, especially when adequate end markets to use this material continue to dwindle. Because of the abundance of CRT recyclers, who previously earned $200 per ton recycling CRT glass only a few years ago, they now typically pay $200 or more per ton to process the same glass. This can prove costly for recyclers who claim that they are not being adequately compensated by electronic equipment manufacturers, who are responsible under the law for the cost of collecting and recycling CRTs. For many recyclers, any revenue generated from the recovered material on the back-end and discretionary added premium services, such as a home pick up or assisted data removal that they may offer along with mandated free collection, are not enough to offset losses resulting from inadequate payments from the manufacturers and high CRT recycling costs. As a result, there is a net cost to recyclers. Besides these dynamic market forces, there are limited disposal options and increased transportation costs for CRTs, making recycling of CRTs financially burdensome to manufacturers and not viable for some recyclers.

On August 7, 2013, the Department issued an enforcement discretion policy to allow regulated parties, such as CRT collectors and processors, to store used CRTs and CRT glass removed from CRTs prior to legitimate recycling in compliance with federal regulations, while the Department completes the promulgation of those requirements into State regulations. This discretion policy provides a protective but streamlined approach to managing these materials and thereby significantly encourages the recycling of this glass. Specifically, regulated parties will be allowed to comply with the requirements of the "CRT Rule" promulgated by the United States Environmental Protection Agency (USEPA) at 40 Code of Federal Regulation (CFR) §261.39 (71 Federal Register (FR) 42928-42949, July 28, 2006).

More regulatory guidance and flexibility, both at the federal and state levels, will likely help to ensure strong end markets for processed CRT glass, help facilitate the creation of new opportunities for innovative recycling business and encourage job creation across the state.

Definition Clarifications

There is no definition for “collective electronic waste acceptance program” under the Act. Such a definition is needed, considering that collectives play such a large role in the implementation of New York’s e-waste program. More than 50 percent of manufacturers currently belong to a collective organization. While the “collective electronic waste acceptance program” was provided in the Act as an option for manufacturers to use, their responsibilities need to be more clearly defined.

The Department also believes a clear definition is needed for an “electronic waste collection event”. There is currently no language describing what constitutes such a collection event. The Department cannot always track and account for e-waste collected at in-state collection events and processed by out-of-state entities if the e-waste collected is not claimed as part of a registered manufacturer’s program. The Department will work to close this gap and require electronic waste collection event organizers to report e-waste collected at all these events.

VIII. Department Recommendations

Acceptance Standard Distribution Date

The Department will continue to evaluate and pursue options that will allow manufacturers’ acceptance standards to be provided to them well in advance of the program year for which the standard is distributed. Currently, acceptance standards are provided to manufacturers nearly halfway through the program year in which they apply. In order for manufacturers to receive an acceptance standard in advance of an upcoming program year, the calendar years of sales data to be used in the acceptance standard calculation would likely need to be altered. This would allow manufacturers to better plan for their electronic waste collection, recycling and reuse programs.

Data Management System Development and Online Reporting

The Department is working to secure a comprehensive system for the management of the large amount of data received from the Act’s regulated entities. To date, Department staff have used a short-term desktop spreadsheet solution for managing the e-waste program’s registration and annual reporting data. Paper submittal of registration, reporting and fee forms is still used. Online reporting would streamline the submittal and review of collection data for both regulated entities and the Department.

Manufacturer/Collective Program Improvement

The Department has found that many manufacturer and collective electronic waste acceptance programs are deficient and fail to comply with one or more provisions of the Act. The Department has made numerous attempts to bring each program into compliance by notifying manufacturers and collectives of shortfalls existing within their programs, as well as providing guidance on how to correct any such violations. Staff will continue to expand its outreach to manufacturers and collective organizations, encouraging them to enhance their electronic waste acceptance programs to meet all of the requirements of the Act. Emphasis will be placed on the provision of a continuous, convenient and effective acceptance program; the improvement of consumer education and outreach programs; and the importance of timely submittal of complete and accurate annual reports and associated fee payments. If the Department’s various outreach and education efforts to manufacturers and collectives continue to prove ineffective in addressing these issues, the Department plans to move toward taking stronger enforcement actions to ensure compliance with the Act.

Require Registration from All Manufacturers

Registration and annual reporting should be required of all manufacturers of CEE selling into the state irrespective of the current threshold. The department would still advocate that only those manufacturers crossing the sales threshold of 1,000 units/year continue to be required to pay registration and annual reporting fees and set up an e-waste acceptance program. This additional reporting would help keep

track of all compliant manufacturers and their branded electronic equipment being sold in New York State. Presently, only manufacturers who meet the 1,000 unit/year sales threshold are required to be registered and listed on the Department's website. It would be helpful for retailers of CEE who are allowed only to sell compliant brands to see all manufacturers' brands that may be sold into the state, rather than just those that are currently required to be registered. Without registration of those falling under the sales threshold, the Department has no way of knowing all brands that may be legitimately sold into the state and, therefore, cannot adequately inform retailers.

Regulation Development

The Department anticipates promulgating rules and regulations on standards for reuse, e-waste acceptance credits, waivers of recycling surcharges, and acceptable alternative methods for determination of sales data, among other areas in the Act that may require further clarification or guidance. The rulemaking process has begun and will be developed to reflect many of the challenges and lessons learned during the earlier implementation of the program.

Add Definitions

Definitions should be added for "collective electronic waste acceptance program" and "electronic waste collection events." These definitions would help to clarify participation in the program for those manufacturers considering using a collective to meet their acceptance standard and provide guidance for entities who arrange e-waste collection events in New York State. Reporting requirements should be clearly defined for both collective organizations and for collection event coordinators to ensure this valuable collection information is not lost.

Consolidation Facility Elimination

The Department recommends eliminating the entity referred to as a "consolidation facility". This term has become a source of confusion to the regulated community. After two program years it has proven unnecessary to the e-waste program and the Department recommends its elimination. Current e-waste consolidators who limit their activity to simple collection and sorting could be reclassified as collection sites while those consolidators who test and process collected e-waste for reuse could be considered recyclers.

Recycling of Cathode Ray Tubes (CRT's)

While large quantities of CRTs have already been collected, a large number of these CRT units (computer monitors and televisions) are still expected to be returned for recycling over the next 5 to 10 years. A combination of market factors, such as the lack of needed new capacity and decreased value for the processed glass, increased transportation and processing costs, and possibly mismanagement, has led to increases in the cost to recycle these wastes. These factors have made recycling CRTs increasingly burdensome to businesses and not financially viable for recyclers, and have ultimately provided fewer opportunities for consumers to recycle these units.

Options should be considered to help reduce the costs of transporting and processing of CRTs. Additional requirements for the manufacturers to pay certain minimum amounts towards this recycling effort may also help to alleviate the CRT management situation. The following recommendations could help mitigate these problems:

1. Storage flexibility should be considered, as well as removing inconsistencies with federal regulations concerning the management of CRTs.
2. Require manufacturers to reimburse the recycler, at minimum, the actual cost of transport and processing the CRT glass. This amount could be determined by the lowest of three bids obtained by the recycler. The manufacturer could have an option to suggest a vendor for bidding or contract directly with the processors for transport and processing of the CRT glass.
3. Provide grants and other incentives to CRT processors to locate in New York State.

IX. Looking Forward

Manufacturer E-waste Acceptance Credit Tracking

Beginning in the 2014 program year, if a manufacturer accepts more than its manufacturer's acceptance standard of e-waste, the excess weight may be used as e-waste acceptance credits. Starting in 2015 these e-waste acceptance credits may be sold, traded, or banked for a period of no longer than three calendar years following the year in which the credits were earned. No more than 25 percent of a manufacturer's obligation for any calendar year may be met with credits generated in a prior year. In addition, manufacturers may not buy, sell or trade credits in the year in which they are earned. The Department is working to develop and implement a system for tracking such credit transactions.

Disposal Ban for Everyone

Beginning January 1, 2015, the Act prohibits anyone, including individuals and households, from disposing of e-waste or placing it for disposal or for collection that is intended for disposal. As this disposal ban applies to the largest group disposing of e-waste, all program stakeholders will need to increase outreach and education efforts regarding the disposal ban to ensure consumer compliance with this prohibition. Both the Department and CEE manufacturers will need to continue and enhance educational efforts, especially for consumers, through their channels and on their websites. Additionally, waste transporters and solid and hazardous waste management facilities will need to conduct education and outreach activities to communicate this important last phase of the disposal ban to their customers.

Data Management System Development and Online Reporting

Staff are working toward the development of a long-term data management solution that will merge existing data with a comprehensive data management system, and that will provide for more streamlined and useful data output. Online reporting for regulated entities and an e-waste collection site geo-mapping feature as well as verification and cross-checking of reported data from the various stakeholders are just some of the features the Department is seeking to provide stakeholders through this new solution. Program staff have been granted approval to move forward and pursue a commercial software purchase, which appears to be the most cost-effective alternative to fulfill most of the program's critical e-waste business requirements in the timeliest fashion. Efforts to finalize the contract to begin development of the data management system with a selected contractor are continuing.

Fluctuating Market Trends

Market forces are slowly at work doing what the law intended, providing municipalities a free or minimal cost option to recycle their e-waste. Prior to the Act, municipalities had to bear the entire cost of collecting and recycling e-waste if they chose to operate programs for their residents. With the passage of the Act in 2010, many manufacturers chose to negotiate agreements with municipalities, whereby the manufacturer provides free recycling to a municipality's residents (through arrangements with recyclers) in return for the ownership of the weight collected, which would be applied to meet the manufacturer's collection goal.

A shift occurred in the 2013 program year when competing recyclers began bidding up the price per pound of e-waste considerably, thereby providing a small, yet welcome, revenue stream for many municipalities. With municipalities expecting higher prices for their e-waste, and manufacturers offering minimum reimbursements to recyclers, incentives for recyclers to aggressively collect began to disappear. By the end of 2013, at least one recycler had terminated all its municipal contracts and another decided to charge for the collection and recycling of CRTs from collectors, thus limiting the collection opportunities available to consumers. Other recyclers appear to be slowly adjusting their practices by no longer paying municipalities for their less valuable e-waste. While the Department has no control over agreements between municipalities and recyclers, it will continue to closely monitor the delicate balance of these fluctuating market trends and their effects on consumer convenience and overall program performance.

Recycling Facility Visits and Inspections

As the program has expanded and the number of e-waste recycling facilities increased, the need for oversight of these facilities has grown. Recent reports of abandoned warehouses containing hazardous CRT materials in other states support the need for closer monitoring of facilities collecting e-waste, especially downstream processors and recyclers. Department staff have conducted site visits at a number of electronic waste recycling facilities based upon reports of collected electronic waste remaining on-site at year end. A total of 19 electronic waste recycling facilities were recently visited to determine compliance with New York State's e-waste law and to ascertain the presence of any CRT or CRT material stockpiles. With the exception of one relatively small facility that was issued a Notice of Violation for having CRT materials on site exceeding the one-year storage limit, all visited facilities were found to be in compliance with no evidence of CRT stockpiling taking place at this time. The Department intends to visit the remaining e-waste recycling facilities in the near future and conduct such visits on an ongoing basis to ensure compliance with the Act.

Recycling of Cathode Ray Tubes (CRTs)

A Commissioner's Policy (CP-57), "Use of Enforcement Discretion for Cathode Ray Tube (CRT) Glass" was issued in August 2013 that partially adopts EPA CRT rules to help relax CRT management requirements, and is available on the Department's website at: **http://www.dec.ny.gov/regulations/89804.html**. The Department has also helped to fast track the siting of a new CRT glass processing facility in western New York.

Program Implementation in New York City

The City of New York Department of Sanitation (DSNY) has begun to implement a comprehensive and innovative collection program called "e-cycleNYC", as of September 18, 2013. More information on this program is available on DSNY's website at: **http://www1.nyc.gov/site/dsny/resources/initiatives/e-cyclenyc.page**. The program involves a combination of e-waste pickups from high rise buildings and collection events involving high rise buildings located in close vicinity. According to recent DSNY reports, the City has signed up about 119 high rise structures which provide an opportunity for the residents for the collection, recycling and reuse of their electronic waste. Three types of collection services are being offered by DSNY's contractor, Electronic Recyclers International., Inc., that include locked bins, storage rooms that are street accessible and collection events that can be organized at the request of the building owners. DSNY has developed an extensive public education campaign with multi-lingual informational material provided to City residents and potential participants. This program is expected to help improve consumer convenience for a large number of apartment dwellers and significantly improve the collection of e-waste throughout the City. The Department will be closely monitoring this new program and assessing its performance to ensure compliance with the Act.

Continued Stakeholder Dialogue

The Department will continue to interact with all stakeholder groups to address critical concerns and identified challenges aimed at improving overall program performance. The New York Product Stewardship Council (NYPSC), with assistance from the Product Stewardship Institute, sponsored a day-long Summit on the Implementation of the Act on January 23, 2014 in Albany. The goal of the Summit was to begin a multi-stakeholder dialogue with municipal and state representatives, e-waste collectors/ consolidators/ recyclers, electronic equipment manufacturers, collective organizations and environmental groups to discuss ways to better implement the law and achieve its goals. Over 65 key individuals were invited by the NYPSC to participate in the Summit to express their position and perspectives on what they see as the challenges to the implementation of the program. The forum provided stakeholders an excellent opportunity to discuss those elements of the State's e-waste program that are working well, which areas need improvement and potential actions or steps that can be taken or considered to help fulfill the goals of this very comprehensive extended producer responsibility law. This information will also assist the Department in identifying critical issues that could be addressed in the upcoming rulemaking activities. The critical dialogue begun at this Summit is continuing and will help address the short and long-term challenges that have been identified. This will result in a stronger and more sustainable New York State e-waste management program for all participating entities.

CONTACT INFORMATION

Product Stewardship and Waste Reduction Section
Division of Materials Management, Bureau of Waste Reduction and Recycling

New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7253
P: (518) 402-8706 | F: (518) 402-9024 | ewaste@dec.ny.gov
www.dec.ny.gov

Review Version:

e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment©

Review Version 2.0

November 1st, 2013

The e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment©

Review Version 2.0

NOTE: This is NOT the complete version of the e-Stewards Standard

Purpose of this Review Version of the e-Stewards Standard:

The purpose of this Review Version is to provide interested parties access to the industry specific performance requirements in the complete e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment©. It is intended for information purposes only, as it does not contain the ISO 14001 language which is a critical part of the complete e-Stewards Standard. Therefore, this Review Version should not be used for any certification purposes. Any entity wishing to see the complete e-Stewards Standard should purchase a copy at www.e-stewards.org.

The second edition of the e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment© will be known by that name followed by the qualifier "Version 2.0". The Standard is available at www.e-stewards.org for a fee. **This Review Version is offered at no cost at the same web site.**

Amendments to the e-Stewards Standard, issued since publication of the most recent version of the Standard, are updated and only made available at no cost in the current and associated Sanctioned Interpretation document on the e-Stewards website, at www.e-stewards.org

The e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment: Version 2.0© will cancel and replace the first edition (e-Stewards Standard for Responsible Recycling and Reuse® 1.0, July 15, 2009), eighteen months after the publication date of Version 2.0.

Copyrights

e-Stewards® copyright

TABLE OF CONTENTS

FOREWORD

The e-Stewards® Standard and accredited third party certification program were initiated at the request of leaders in the recycling and refurbishment industries, in order to better distinguish their businesses in a marketplace where some practices result in profound negative impacts on the global environment and human health, and fail to meet customers' needs for responsible recycling.

The development of the Standard was led by the Basel Action Network (BAN), a non-profit organization working globally to prevent the illegal and unjust trafficking of hazardous waste, based on the United Nations' *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*.

The ongoing work of preparing and revising the standard is accomplished using a multi-stakeholder process with leaders in the industry via the e-Stewards Leadership Council and its Technical Committee, as well as other experts, such as specialists in health and safety, batteries, and data security. In addition, global norms, as determined within Basel Convention forums, are considered baselines. A public comment process allows the public to provide input into the draft standard. All comments received are then reviewed and considered in preparation of the final standard.

The e-Stewards Standard is maintained and revised at appropriate intervals through an ongoing mechanism of formal multi-stakeholder revisions, as industry and technology advance and as further research identifies risks and hazards prevalent in this industry. Between major revisions of the Standard, the e-Stewards program administrator publishes the e-Stewards Sanctioned Interpretations as needed, found at www.e-stewards.org, in order to clarify language or make formal changes in requirements. All Organizations seeking certification must meet requirements in both the e-Stewards Standard and the current Sanctioned Interpretations (if any).

This second edition, the e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment: Version 2.0©, November 1, 2013, cancels and replaces the first edition (The e-Stewards Standard for Responsible Recycling and Reuse®: Version 1.0, July 15, 2009), eighteen months after the publication date of Version 2.0. However, all certification audits, including surveillance and re-certification audits, conducted after 6 months following the publication of Version 2.0 (i.e. after May 1, 2014) must be conducted against Version 2.0 of the Standard.

Governance of Stewards certification program

The e-Stewards® Standard is owned and copyrighted by the Basel Action Network (BAN), a non-profit public interest group, for use in an accredited third party audited certification program. BAN is led by its board of directors with considerable guidance on this program from the e-Stewards Leadership Council and their Technical Committee. BAN and/or its licensed program administrator provide oversight of the accreditation and certification functions (conformity assurance), the Standard, and proper usage of the e-Stewards mark.

Structure of e-Stewards conformity assurance program

The e-Stewards certification program is based on global standards for accreditation (ISO 17011) and certification bodies (ISO 17021), and invokes norms and guidance published by the International Accreditation Forum (IAF).

Figure 1: Structure of e-Stewards Certification Conformity Assurance

INTRODUCTION

Welcome to e-Stewards Certification

Welcome. In becoming an e-Stewards recycler, you join an elite group of businesses that are recognized as the world's best recyclers and asset managers of used Electronic Equipment. By becoming an e-Stewards recycler you also become part of a much larger e-Stewards community that is made up of many more stakeholders, including concerned consumers, environmental groups, enterprise companies, non-profits, universities, local governments, policy makers, and others that have learned that it does indeed matter *how* used Electronic Equipment is managed and traded - domestically and internationally. These stakeholders have joined together to help create, and now foster and spread, the e-Stewards certification and ethic into every neighborhood and country.

Beginning as a vital tool in the United States and Canada to promote much needed conformity with the Basel Convention - established international waste trade law - the e-Stewards Standard is now available for use all around the world. Certified e-Stewards recyclers range from non-profits to small family businesses to multi-billion dollar transnational companies. While e-Stewards recyclers and the greater e-Stewards community are a diverse group, they all share the common bond of a desire to be leaders. Such leadership embraces the notion of the "triple bottom line" that defines success not just in financial terms, but also by the kind of social and environmental legacy one leaves future generations.

Purpose and value of the e-Stewards Standard

The e-Stewards® Standard is established and copyrighted by the Basel Action Network (BAN) for use in an accredited third party audited certification program. It was created in partnership with leaders in the recycling industry to provide rigorous, yet practical operational criteria for globally responsible recycling and refurbishing of Electronic Equipment.

The Standard is unique in that it requires consistent conformity by an entire corporate or organizational entity (e.g. with multiple facilities or assets), not just individual facilities within such an entity. In addition, the Standard provides a verifiable and operational framework with specific performance requirements to:

- Protect Customer Data and privacy,
- Protect occupational health and safety, and communities surrounding facilities,
- Prevent pollution, reduce environmental impacts, and facilitate efficient use of resources,
- Ensure fair labor practices, specifically excluding forced and child labor, and prison operations for managing hazardous e-waste,
- Require proper disposal of hazardous e-waste, specifically limiting it from solid waste disposal,
- Operate in conformity with international laws, treaties, and agreements throughout the Recycling Chain - in essence, preventing toxic waste exports from developed to developing countries, and
- Ensure that the above criteria are extended downstream of the e-Stewards recycler.

Value of the program for e-Stewards Organizations

e-Stewards certification has been available since 2010, and its history has demonstrated that Organizations implementing the e-Stewards management system see a positive impact on their businesses due to their increased ability to:

- Differentiate their services for customers seeking assurance that their electronics are being managed in an environmentally and globally responsible manner,
- Reduce worker exposures, injuries, and lost time,
- Identify and manage environmental, health, safety, and operational risks,
- Create opportunities for business improvement, improved compliance, and risk reduction, and
- Lay the groundwork for successful customer audits and regulatory inspections.

Due to the significant health and safety risks prevalent in the electronics recycling industry, in any country, the Standard has integrated essentially all of the concepts and elements of BS OHSAS 18001, the standard for occupational health and safety management systems. Therefore, even though the e-Stewards Standard does not require certification to BS OHSAS 18001, it should not be difficult to achieve this additional certification, should an Organization choose to obtain it.

Overview of environmental, health, and safety management systems

Environmental, health, and safety management systems have been designed to provide a business framework for ensuring that an Organization manages risk and maximizes business value.

In practice, the e-Stewards program provides businesses with a best practices framework to effectively manage the different types of risks it faces, whether they are environmental, health and safety, legal, operational, or customer related. Once established, this system provides a living tool for continually improving business performance.

The following Figure 1 provides a graphic illustration of the process for implementing an e-Stewards certified environmental, health, and safety management system (EHSMS).

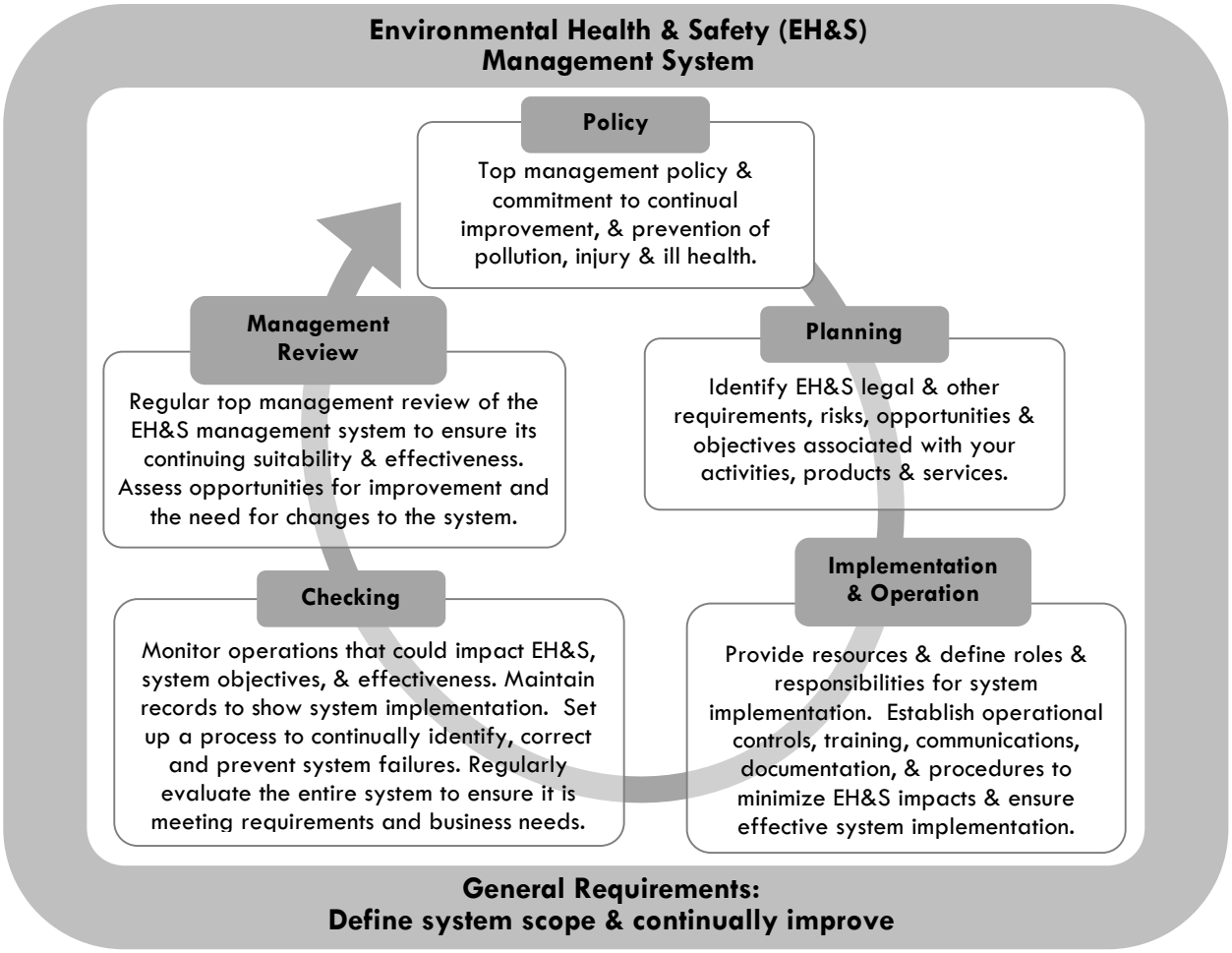


Figure 2 — Simplified overview of environmental, health, and safety management system

Appendix A numbering

For ease of use, the subsection numbers in section 4 of the body of the Standard are reflected in the corresponding subsections in Appendix A. For example, 4.4.6.5 and A.4.4.6.5 both pertain to downstream accountability, and 4.5.1.2 and A.4.5.1.2 both deal with airborne hazards.

Acronyms used in the Standard

Key defined terms (see Glossary, section 3) frequently used as acronyms in this Standard:

Acronym	Defined Term
IDP	Immediate Downstream Processor
HEE	Hazardous Electronic Equipment
PCM	Problematic Components & Materials
PHPT	Potentially Hazardous Processing Technologies
HEW	Hazardous Electronic Waste

ENVIRONMENTAL MANAGEMENT SYSTEMS - REQUIREMENTS WITH GUIDANCE FOR USE

1. Scope

The complete e-Stewards Standard (but not this Review Version) *specifies requirements for an environmental management system* which include ISO 14001 requirements and health & safety *management system requirements*, as well as more specific e-Stewards' requirements, often beyond legal requirements.

The e-Stewards certification and the e-Stewards Standard are intended to provide electronics recyclers, refurbishers, asset managers, processors, refiners and others with a formal framework with which to:

a) *Implement, maintain and improve an environmental management system* that includes occupational health and safety, responsible reuse and recycling, data security, and accountability for toxic materials throughout the Recycling Chain;

b) *Assure itself and others of its conformity with the environmental* and health and safety *policy* required in the complete Standard, *as well as any additional stated environmental policy*;

c) Operate, with respect to export of Electronic Waste, as if their country has ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, and the Basel Ban Amendment; and

d) *Demonstrate such conformity* with the complete *Standard by seeking certification/ registration of its environmental*, health and safety *management system by an external certifying body* accredited to certify to the complete e-Stewards Standard.

Collectors, Brokers, and transportation companies are currently not eligible for certification under the e-Stewards program.

The complete Standard represents minimum requirements to attain e-Stewards certification. It is therefore a baseline and should not preclude individual companies from taking further steps that are more rigorous and more protective of the environment, occupational safety and health, community health, social welfare, and data security.

The complete e-Stewards Standard specifies minimum performance requirements for eligible Organizations in the electronics Recycling, asset recovery, Processing, and refining industries, inserted into the framework of the ISO 14001 environmental management system standard. This enables an Organization to develop policies and objectives which also take into account information about significant health and safety, data security, and social accountability aspects of its operation.

The term "environmental management system", as used throughout the Standard, includes within its scope the environmental, occupational health and safety, data security, social accountability, and other performance requirements identified in the Standard. The scope of the management system also extends to Ancillary Sites owned and/or Controlled by the e-Stewards corporate entity (see Appendix B for more information on Ancillary Sites.)

1.1 Application

1.1.1 Integration with ISO 14001: 2004

The complete e-Stewards Standard (but not this Review Version) fully incorporates the requirements of the international environmental management systems standard, ISO 14001: 2004 © (ISO). It also includes industry-specific performance requirements which are fully integrated into ISO 14001and are written for use internationally. This Review Version paraphrases but does not duplicate ISO 14001 language.

For the sake of clarity in this Review Version, regular font indicates the e-Stewards industry-specific performance requirements throughout this Version, while *italic* font paraphrases requirements from ISO 14001: 2004. The font style does not infer greater or lesser importance of the text. Conformance to the e-Stewards Standard requires that both ISO 14001 and the e-Stewards performance criteria (as defined by the complete e-Stewards Standard) be met in order to receive e-Stewards certification. Those seeking certification should not rely solely upon this Review Version to understand all requirements.

1.1.2 New edition of Standard and Sanctioned Interpretations

The second edition of the e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment: Version 2.0© (e-Stewards Standard) cancels and replaces the first edition, the e-Stewards Standard for Responsible Recycling and Reuse®: July 15, 2009 (Version 1.0), eighteen months after the issue date of Version 2.0.

In addition, between major revisions of the Standard, the e-Stewards program administrator publishes the e-Stewards Sanctioned Interpretations as needed, found at www.e-stewards.org/files/SI/e_Stewards_Sanctioned_Interpretation_V2.pdf, in order to clarify intentions and/or make formal changes in requirements. All Organizations seeking certification must meet (be audited to) requirements in both the current complete e-Stewards Standard and the current and corresponding version of the e-Stewards Sanctioned Interpretations.

1.1.3 Geographic scope of the e-Stewards certification program globally

e-Stewards certification is available to Recycling entities and their facilities in any country where e-Stewards accreditation and certification bodies are allowed to work. If, however, the candidate entity/facility(s) is located in a country that is not an OECD, EU, or EFTA member country, then their potential e-Stewards certification body(s) must first notify the e-Stewards program administrator of the application to the certification body (CB), and the CB must receive written approval from the program administrator prior to proceeding with a contract for facility certification in any of these countries (i.e. outside of OECD, EU, and EFTA member countries).

1.1.4 Eligibility for certification

e-Stewards certification is currently available to entities with facilities that perform significant Recycling of Electronic Equipment, including but not limited to refurbishers, asset managers, dismantlers, shredders, and Materials Recovery operations. Such entities may be owned by for-profit, not-for-profit, non-profit, or public entities. e-Stewards certification is currently not available to Intermediaries, such as Brokers, logistics companies, or entities that only collect Electronic Equipment and/or perform software data sanitization without conducting other Recycling operations (see definition of Recycling). End Processors may contact the e-Stewards program administrator to explore eligibility.

1.1.5 Facilities required to become certified

Corporate certification: The e-Stewards certification program requires certification of all Recycling facilities located within one country and owned (fully owned or owning a controlling interest) by a corporate, organizational, or government entity. While individual Recycling facilities may receive a site certification, all multi-sited e-Stewards entities shall eventually possess e-Stewards certification of all its eligible Recycling site, as well as all its electronics Recycling subsidiaries, regardless of brand. (See Appendix B for more information.)

Ancillary Sites: In addition, all Ancillary Sites associated with a Recycling facility shall be included within the Organization's documented management system. (See Appendix B for more information.)

Separate electronics Recycling companies with same ownership: In addition, if the top management or owner(s) of an e-Stewards entity also owns or owns a controlling interest in a separate electronics Recycling entity, all of these Recycling entities and facilities are also required to become e-Stewards certified. (See Appendix B for further details.)

1.1.6 Defined terms

e-Stewards-specific terms and requirements defined in the glossary are capitalized throughout this document. ISO-defined terms are not capitalized.

1.1.7 Use of the terms "shall" and "should"

The term "shall" is used in this document to indicate those provisions which are mandatory. The term "should" is used in this document to indicate a recognized means of meeting a mandatory requirement of the Standard. An Organization may meet a "should" requirement in an equivalent way, provided that equivalence can be demonstrated to the satisfaction of the Organization's e-Stewards certification body.

1.1.8 Requirements in footnotes and appendices

This document contains both footnotes and a number of appendices which contain requirements for those Organizations seeking or maintaining certification. Appendix D does not contain requirements, and is provided for guidance.

1.1.9 Hierarchy of legal compliance and voluntary conformity with Standard

Where requirements in the Standard conflict with legal requirements, or the Organization is required by law to manage electronic equipment in specific ways, the law will prevail. However, where the voluntary Standard is not in conflict with laws, the e-Stewards requirements shall be implemented; for example, the e-Stewards definition of Hazardous Electronic Waste and export restrictions go beyond laws in some countries, and thus shall prevail for all e-Stewards Organizations, except where in direct conflict with such laws.

1.1.10 Restricted use of this Standard

An Organization may only claim to meet the Standard and/or be an e-Stewards recycler if the Organization is currently certified by an accredited e-Stewards certification body and is currently licensed to use the e-Stewards name and logo by the Basel Action Network or its program administrator.

The Standard may only be used as part of e-Stewards accredited certification, a third-party audited, accredited certification program, as licensed by the Basel Action Network. Its use in any other way, other than for informational purposes, is not authorized.

2 NORMATIVE REFERENCES

ISO 14001: 2004 (fully incorporated into the complete e-Stewards Standard- but not in this Review Version of the Standard)

SA8000 (not provided)

3 GLOSSARY OF TERMS

Please refer to ISO 14001:2004 (E) Section 3 for a listing of unique terms that are used within ISO 14001.

Terms and definitions pertaining to the e-Stewards Standard performance criteria

3.21 Ancillary Sites

Locations or operations owned, leased, or Controlled by the Organization, other than Recycling facilities, which serve as sites for collection, receiving, sorting, consolidating, warehousing, storing, cross-docking, administration, retailing, wholesaling, and/or web-based selling of Electronic Equipment, and any other activities not covered by the term Recycling but involving management of Electronic Equipment.

3.22 Annual

Any 12 consecutive month period, with the starting date for the period defined by the e-Stewards Organization, with subsequent one year periods matching the originally defined 12 month period.

3.23 Broker

An Intermediary in the Recycling Chain which buys, sells, transfers, or donates Electronic Waste, without significantly[1] Recycling it. Brokers may or may not take physical possession of equipment.

3.24 Certified Industrial Hygienist or Equivalent

A health and safety professional who:

a. Is currently certified by an industrial or occupational hygiene certification agency that is a recognized certification scheme by International Occupational Hygiene Association (IOHA)[2] or other internationally or nationally accredited organization that certifies occupational or industrial hygiene professionals, or
b. Has spent at least 10 years as a full time (at least 75% of their job duties) trained industrial hygiene professional, or
c. Has a minimum of 5 years of experience, specific to the electronics recycling industry, as a full time (at least 75% of their job duties) trained industrial hygiene professional.

3.25 Commodity

[1] For example, cutting cables from devices does not disqualify someone from this definition

[2] Refer to www.ioha.net for the latest listing of IOHA organizations

Materials (as opposed to wastes) derived from primary resources (mined or extracted from virgin raw materials) or from secondary materials (recyclables or wastes) which need no further Processing, cleaning, separation, or Recycling[3] and are not destined for Final Disposal[4], but will instead be:

a. Sold directly into a market as new consumer products, or
b. Used as a direct feedstock in primary manufacturing processes, and
c. Used in applications which will not release harmful emissions or leachate, or produce hazardous by-products or residues that fail the threshold levels listed in the definition of Hazardous Electronic Equipment, as determined by testing.

3.26 Competent Authority

For nations that have ratified the Basel Convention, the Basel definition of Competent Authority applies.[5] For the USA, the definition found in OECD Agreement C (2001) 107/FINAL applies. For countries not party to either of these two instruments, this term refers to the designated government agency responsible for approving transboundary movement (imports, transits, and exports) of hazardous wastes, recyclables, and reusable materials and equipment.

3.27 Control

Activities and/or services in which the e-Stewards Organization bills, collects, stores (including off-site or leased storage), transports, Recycles, makes decisions about, represents services as e-Stewards services, and/or otherwise makes arrangements for Electronic Equipment, even if the Organization never takes possession of the equipment or materials.

3.28 Customer Data

Any digital or analog data or information located in, on, or about any Electronic Equipment derived from any media, including but not limited to digital memory, magnetic memory, floppy drives, hard or flash drives, audio or video recordings, paper, microfiche, photographs, and labels, which:

a. Could identify individuals (such as former or current users, owners, employees) or allow discovery of such users or their activities, including information such as Internet Protocol (IP) addresses, email and mail addresses, phone numbers, ID numbers, passwords, correspondence, documents, photographs,
b. Could identify or allow discovery of information about a corporation or organization and its activities, except for an asset number or code, the corporate name, its logo, and publicly known information about the corporation or organization,
c. Consists of licensed software, if the electronic device will not be returned to the licensee, or
d. Consists of financial information of any kind other than sales price of equipment.

3.29 Downstream Processor

Any facility which Recycles/Processes or otherwise manages any Electronic Equipment (including materials derived from it) that pass through the e-Stewards Organization's facility or Control. Downstream Processors include initial processors which an e-Stewards Organization arranges to receive/Process customer equipment, if the Organization benefits in any way or represents such

[3] (i.e. any Basel Convention Annex IV B destinations)

[4] (Basel Convention Annex IV A destinations)

[5] www.basel.int

services as e-Stewards services. Downstream Processors do not include Intermediaries or Final Disposal Facilities.

3.30 Due Diligence (also known as Duty of Care)

The duty to gather necessary information on actual or potential risks involved in business relationships and donations, both direct and indirect, and validating that representations made by another party are complete, accurate, and fully truthful by means of measurement/assessment, examining documentary evidence, direct observations, researching historical and current performance, and contacting relevant parties to verify the veracity of information. Ongoing Due Diligence requires continual verification of the abilities of other parties to fulfill the agreements, conditions, and requirements of the e-Stewards Organization.

3.31 Electronic Equipment

Electrical and electronic equipment and/or components, in any form, e.g. whole, disassembled, shredded, or granulated, including:

a. Those that are dependent on electric currents or electromagnetic fields in order to work properly and have never contained ozone depleting substances, combustible fuels, or gasses, including equipment for the generation, storage, transfer, and measurement of such currents and fields, and

b. Associated consumables, e.g. ink and toner and their cartridges, compact and other discs, and accessories, such as batteries, chargers, and adapters.

3.32 e-Waste or Electronic Waste

Used or new Electronic Equipment (including components and derived materials) which are:

a. Destined, or are intended to be destined, all or in part (e.g. components removed during Repair/Refurbishment) for Materials Recovery, Recycling, energy recovery, or Final Disposal,

b. Destined, or are intended to be destined, for Repair/Refurbishment or reuse but either are untested for Full Functionality or, if tested, found not to be Fully Functional,

c. Tested and Fully Functional, but for which a legal and legitimate reuse market has not been affirmed, and/or

d. Considered waste by the country of import, transit, or export.

3.33 End Processor

The final Downstream Processor at the end of the Recycling Chain that transforms a mixed, waste, or scrap material into products or into Commodities that will be used again to produce new products with no further refinement or separation of materials or wastes. End Processors may produce residual by-products, such as slag and filter cake, or treated wastes for further Recycling or Final Disposal. End Processors include smelters, and mercury retort, plastics recovery, and glass-to-glass furnace operations.

3.34 End Refurbisher

A certified e-Stewards Organization or their Immediate Downstream Processor(s) that completes the e-Stewards requirements for reuse, as defined in this Standard.

3.35 Environmental aspects / Environmental and Stewardship Aspects

Any facets of an Organization's services, activities, or products that may interact with the environment, health and safety, social accountability, and/or data security.

3.36 Environmental impacts / Environmental and Stewardship Impacts

Changes to the environment, occupational health and safety, social accountability, and/or data security, caused (fully or partially) by an Organization's Environmental and Stewardship Aspects, whether these changes are harmful or helpful.

3.37 Environmental Management System/ environmental management system

Parts of an Organization's management system used to develop, document, implement, and maintain its environmental, health and safety, and data security policy and practices, and manage its Environmental and Stewardship Aspects and Impacts. Included within its scope are the environmental, occupational health and safety, data security, social accountability, and all other performance requirements identified in the complete e-Stewards Standard.

3.38 e-Stewards Organization – see definition for Organization below

3.39 Essential Function(s)

Product features which a user of an electronic product (equipment or component) can reasonably expect to be present based on the original or upgraded design and marketed description of the Electronic Equipment, and features without which safe or effective use would be unlikely. If equipment or components have been Repurposed, Essential Functions must include all features needed to perform for the actual consumer of the Repurposed device, in accordance with the definition of Repurposing.

3.40 Final Disposal

Operations which do not lead to the possibility of Materials Recovery, Recycling, reclamation, Direct Reuse, or alternative uses (i.e. Basel Annex IV Part A). It includes deposit in landfills and/or incinerators (including incinerators with energy recovery), and safe, monitored, retrievable storage.

3.41 Final Disposition

The last facility or operation in the e-Stewards Recycling Chain at which an e-Waste either:

a. Ceases to be a waste by being Processed into a Commodity,

b. Is prepared for Direct Reuse by completing reuse requirements in this Standard, and/or

c. Has arrived at Final Disposal and is finally disposed.

These end points in the Recycling Chain can include Final Disposal facilities (e.g. landfills and incinerators), End Processors (e.g. smelters making Commodity metals), End Refurbishers, and in the case of cleaned CRT cullet, a glass furnace operation, if all requirements have been met.

3.42 Fully Functional/Full Functionality

Electronic Equipment and/or components that have been effectively tested and demonstrated to:

a. Meet or exceed the original functionality specifications for the product/component's Essential Functions, or if upgraded or Repurposed, the intended new specifications for these products,

b. Be safe for use and handling, without electrical, physical, or fire hazards, and not have structural problems (such as cracked casings, screens, or wire sheathing) which could lead to damage or lack of functionality, and

c. Not contain any non-functional Hazardous Electronic Equipment, such as non-working circuit boards, mercury-containing devices, batteries, or CRTs.

3.43 Halogenated Materials

Contain compounds with atoms of the halogen group of elements including fluorine, chlorine, bromine and iodine. In Electronic Equipment, these materials include all plastics, circuit boards, and other items which contain brominated flame retardants (BFRs), polyvinyl chloride (PVC), and components containing polychlorinated biphenyls (PCBs).

3.44 Hazardous Electronic Equipment (HEE)

Electronic Equipment, components, and materials (processed, unprocessed, and residuals) for which the constituents or hazardous characteristics are unknown, or that consist of, contain, or are derived from:

a. Asbestos, except unintentional inputs,

b. Batteries:
   - Of any kind containing intentional inputs of lead, mercury, and/or cadmium,
   - Unsorted batteries or batteries of which the contents are unknown,
   - Batteries containing flammable organic solvents, e.g. lithium ion batteries & battery packs,
   - Batteries containing any other hazardous materials listed in the Basel Convention Annex I and possessing an Annex III hazardous characteristic,

c. Cathode ray tubes (CRTs); CRT glass (including mixed glass); CRT cullet; CRT fines, Phosphors, coatings, and frit from CRT glass; and any materials contaminated with these,

> NOTE: The following are exempt from the definition of HEE:
> 1. CRT glass that is non-leaded and is thoroughly cleaned of Phosphors, coatings, frit, and fines[6], as determined by a toxics characteristic leaching procedure (TCLP) or equivalent method, and
> 2. The metal band around the CRT front panel, and/or the shadow mask, unless they are contaminated with Phosphors or materials listed in the chart in d) below.

d. Circuit boards[7], lamps, switches, or any other parts, materials[8], assemblies, housings, cables, and wires which contain any of the substances listed below in levels exceeding the indicated thresholds. In the absence of knowledge or information regarding the toxicity of Electronic Equipment, in any form, it shall be presumed to be Hazardous Electronic Equipment, unless it can be demonstrated via the US EPA's TCLP Method 1311[9] that the material does not exceed threshold limits in the chart below:

[6] e.g. some, but not all, cleaned front panel CRT glass.

[7] For the purposes of practicality, it can be presumed that all circuit boards will fail these levels and should be presumed to be Hazardous Electronic Equipment due to common constituents such as lead and beryllium, unless they are tested and demonstrated to fall below limits in this TCLP table.

[8] NOTE: This may include shredded plastics contaminated with lead and other toxics, to the extent they fail the cited TCLP.

[9] http://www.epa.gov/epawaste/hazard/testmethods/sw846/pdfs/1311.pdf This is a sample extraction method for chemical analysis employed as an analytical method to simulate leaching through a landfill, defined in US law in 40 CFR Part 261, Appendix II, EPA Method 1311. This is a defined procedure that can be followed by any qualified laboratory, and will serve as a standard procedure until there is a universally accepted TCLP incorporated into this Standard. The TCLP levels are drawn from US Federal Register (40CFR 266 Appendix VII).

TCLP Limits for 3.44 d)			
The following limits are for concentrations of one or more elements (present elementally or found in a compound form):			
▶ Arsenic (unintentional inputs)	▶ 5.0 mg/L	▶ Chromium	▶ 5.0 mg/L
▶ Barium	▶ 100 mg/L	▶ Lead	▶ 5.0 mg/L
▶ Beryllium	▶ 0.007 mg/L	▶ Mercury (unintentional inputs)	▶ 0.2 mg/L
▶ Cadmium	▶ 1.0 mg/L	▶ Selenium (unintentional inputs)	▶ 1.0 mg/L
NOTE: The above levels are to apply to separated components, such as separated circuit boards, separated lamps, switches, plastics, structural metal, or to separated Processing residuals (e.g. shredded circuit boards, or CRT fines), and not to the whole device/equipment they are found in. For example, when testing for beryllium, one should test the circuitry/component where copper beryllium alloy is expected to be found and not the entire computer.			
NOTE: Hazardous Electronic Equipment does not refer to non-hazardous materials such as copper, aluminum, or steel alloys (waste streams listed in the Basel Convention Annex IX), unless that material is contaminated with materials listed in a) – i), or otherwise exceeds the threshold test levels in this chart.			

e. Mercury: Circuit boards, lamps, switches, LCD displays, and other parts, components or assemblies containing intentional inputs of mercury,

f. Polychlorinated biphenyls (PCBs) with levels that exceed actual concentrations >50 mg/kg,

g. Radioactive waste: All components/materials containing or contaminated by radio-nuclides, the concentrations or properties of which result from human activity,

h. Selenium & arsenic: Components and/or devices containing intentional inputs of selenium and/or arsenic and their compounds, including printer or copy drums, and LEDs with gallium arsenide, and

i. Any other materials deemed hazardous waste by the Organization's national government or other countries involved in transboundary trade.

3.45 Hazardous Electronic Waste[10] or Hazardous e-Waste (HEW)

Includes new or used:

a. Hazardous Electronic Equipment (HEE) that is destined, or is intended to be destined for:
   - Recycling, energy recovery, or Final Disposal, all or in part, including shredded material, components, residues, and parts removed during Repair/Refurbishment, and/or
   - Repair/Refurbishment or reuse, but not Direct Reuse, and

b. Electronic Equipment (including components) that is:
   - Tested and Fully Functional but for which a Direct Reuse market has not been affirmed according to requirements in 4.4.6.2 (Reuse), and/or
   - Deemed hazardous waste or banned for importation by the country of import or transit, regardless of type of destination or condition of equipment.

3.46 Immediate Downstream Processor

[10] The term 'Hazardous Electronic Waste' as used in this Standard is not meant to pertain to, nor is synonymous with any current legal national, provincial/state, or local definitions of 'hazardous waste'. In addition, this definition interprets the Basel Convention definitions of hazardous waste as they apply to electronic waste in particular, resulting in a precautionary and pragmatic definition for use in this Standard.

A next-tier[11] facility to which the e-Stewards Organization transfers (with or without Intermediaries involved) Hazardous Electronic Equipment, Hazardous e-Waste, or Problematic Components and Materials in any form. An Immediate Downstream Processor can include End Refurbishers, Downstream Processors, End Processors, and Final Disposal facilities, but does not include Intermediaries such as Brokers.

3.47 Industrial Hygiene

The anticipation, recognition, evaluation, communication, and control of environmental stressors in, or arising from, the workplace that may result in injury, illness, impairment, or affect the well being of workers and/or members of the community.

3.48 Intermediary

Any entity within the Recycling Chain which Brokers, holds, buys, sells, transfers, stores, manages, or facilitates transactions of any e-Waste (including material derived from it) that passes through the Organization's facility or Control, but does not Recycle. Intermediaries include, but are not limited to, Brokers, independent representatives, agents, logistics and cross-docking firms, and freight forwarders. The term Intermediary does not include Downstream Processors.

3.49 Materials Recovery

Operations that are part of a Process to recapture elements, compounds, or materials and transform them into Commodities.

3.50 Occupational Environmental Health and Safety Professional

A professional or a combination of professionals[12] with qualifications and competencies in environmental and occupational health and safety aspects of an Organization's operations, who have all of the following qualifications and competencies in the areas in which they provide services for the Organization:

a. Have successfully completed environmental and occupational health and safety professional development training courses, and update credentials as required, and

b. Can demonstrate knowledge of the electronics recycling industry's hazards, Industrial Hygiene solutions, and environmental risks, in particular those of the operations and facility(s) they serve, through competent risk assessments, records, and auditor interviews, and

c. Either:

- Possess a current certification in environmental and occupational health & safety from a nationally or internationally recognized environmental and occupational health & safety certifying agency; or
- Have spent at least 7 years as a full time (at least 75% of their job duties) trained environmental and occupational safety and health professional with experience pertinent to the work they will perform for the Organization; or
- Have a minimum of the equivalent of 2 years of full time experience and training specific to the electronics recycling industry as an environmental and occupational health and safety professional.

[11] i.e. with no other entities Processing or Recycling the material between the e-Stewards Organization and the subsequent vendor.

[12] For example, physicians experienced in occupational and environmental medicine and medical toxicology, certified industrial hygienists, certified safety specialists, and ergonomists.

3.51 Organization / e-Stewards Organization (see also definition 3.16 Organization)

An eligible entity which is either a candidate for certification to the e-Stewards Standard, or is currently registered as a certified e-Stewards recycler. An Organization includes all assets, property, and operations of the entity, including Ancillary Sites.

NOTE: See 1.1.4 and 1.1.5 above for requirements for eligibility and certifying multiple Recycling facilities with the same ownership in one country.

3.52 Phosphors

Metal compounds which produce light when excited (i.e., are struck by a free electron). Phosphors coat the inside of face plates/front panels of cathode ray tubes (CRTs) (typically a powdery white coating), and are also used in some lamps, such as fluorescent lamps utilizing mercury-based phosphors. Phosphors in the current waste stream are likely to contain compounds of cadmium, mercury, and/or other metals of varying or unknown toxicity or value.

3.53 Potentially Hazardous Processing Technologies (PHPTs)

Technologies, activities, or operations which Process Hazardous Electronic Equipment and/or Problematic Components or Materials, including:

a. Shredding, cutting, grinding, crushing, breaking, baling, pulverizing, fragmenting, cracking, and/or chipping, or any other activities which create dust, particulates, or vapors,

NOTE: The following are not considered a Potentially Hazardous Processing Technology:

- A hard drive punch/drill
- Shredding of separated magnetic storage hard drives, if the circuit boards are manually removed prior to shredding the hard drives. (This exemption does not extend to solid state drives, hybrid drives, or any newer technology which may have imbedded circuit boards.)
- Careful, slow and controlled release of the vacuum in a cathode ray tube (CRT) that is otherwise intact

b. Opening, dismantling, or repairing mercury-containing devices, such as LCD displays or mercury switches, including manual removal of mercury-containing lamps,

c. Thermal or chemical Processes of any kind, including but not limited to smelting, refining, melting, dissolving, reacting, and burning.[13]

3.54 Problematic Components or Materials (PCMs)

e-Wastes which may not be defined as Basel Convention hazardous wastes or e-Stewards Hazardous Electronic Wastes, but which may be hazardous or require special controls or attention in this Standard due to desired recyclability or potential environmental or occupational health and safety risks that may arise from Recycling such components or materials. These include:

a. Sorted alkaline and other non-hazardous batteries, which contain no lead, mercury, cadmium, lithium, flammable organic solvents, or unknown contents,

b. Glycolant coolants,

c. Inks and toners, and their uncleaned cartridges and containers,

[13] This does not include the incidental use of cleaning chemicals including solvents, or hand-held solder guns, if proper precautions are used to prevent exposure to toxic or irritant fumes.

d. Plastics with Halogenated Materials, such as polyvinyl chloride (PVC) and those containing brominated flame retardants, and

e. Other components and materials identified by the Organization as problematic.

3.55 Recycling/Processing

As an alternative to Final Disposal, the physical alteration, manipulation, or management of Electronic Equipment (hardware and software) for the purposes of reuse and/or Materials Recovery. It includes, but is not limited to, manually dismantling, mechanically reducing size, repairing, remanufacturing, Repurposing, refining, End Processing, and harvesting parts from Electronic Equipment. It also includes software manipulation such as data sanitization and software installation, upgrading, and testing. Final Disposal and energy recovery are not Recycling.

3.56 Recycling Chain

All entities, activities, and operations beginning with the initial e-Stewards Organization and including any of its downstream vendors that manage, receive, transfer, storage, Broker, Process, Repair/Refurbish, Recycle and/or finally dispose of Electronic Equipment that passes through an e-Stewards Organization's facility or Control, through but not beyond Final Disposition. The Recycling Chain includes, but is not limited to, all Ancillary Sites, Downstream Processors, End Refurbishers, Intermediaries, End Processors, Brokers, and Final Disposal facilities that manage any Electronic Equipment from the Organization or under its Control.

NOTE: The end of the Recycling Chain for cleaned CRT glass, but not its residuals, destined for use as a feedstock in the manufacture of new products is at the facility manufacturing new products using the CRT glass.

3.57 Repair/Refurbish(ment), or Repairing/Refurbishing

The process and activities required to transform used or unused Electronic Equipment (including components) into Fully Functional Electronic Equipment for Direct Reuse rather than for Materials Recovery or Final Disposal. Such activities may include cleaning, data sanitization, software and hardware changes or upgrading, fixing hardware faults, replacing or removing faulty or unwanted components, remanufacturing, removal of identifying labels/stickers, and/or Repurposing. Repair/Refurbishment activities usually result in some e-Waste (e.g. non-functional parts or devices) that will be destined for Recycling or Final Disposal.

3.58 Repurposing

A form of reuse that relies on the primary data processing function of Electronic Equipment, (except photo voltaic modules), but utilizes that function for a purpose or context other than originally intended, e.g. combining CPUs or motherboards for use as a network server.

3.59 Shipping Records

Verifiable records of incoming and outgoing shipments or transfers of Electronic Equipment (including components and materials derived from equipment), including shipping logs, invoices, bills of lading/waybills, other commercially-accepted documentation of transfers, and the corresponding acknowledgements of receipt from receiving facilities. Such records should contain weights of materials and/or piece/unit counts, date, consignee and consignor, and verifiable contact information for entity that transfers shipment.

4 Environmental management system requirements

4.1 General requirements

An e-Stewards *Organization shall create and maintain a documented environmental management system (EMS) in conformance* with the complete e-Stewards Standard*, and identify and document the scope of their EMS.*

An e-Stewards *Organization's Environmental Management System shall:*

a) *Include occupational health and safety, data security, and social accountability management system(s), and other requirements specified in* the complete e-Stewards Standard, and

b) Apply to:

1. The Electronic Equipment, property and assets under the Organization's ownership and/or Control, and
2. Workers, including temporary, part time, and contract workers, volunteers, and interns.

4.2 Environmental policy

An e-Stewards *Organization's highest level of management shall document, implement, and maintain its environmental and health and safety policy, ensuring that it is scaled appropriately to the impacts of its activities, addresses the need for continual improvement and pollution prevention, offers the structure for developing and monitoring progress toward environmental, occupational health and safety, and data security goals and targets, and commits to compliance with all legal and other requirements that are applicable.*

An e-Stewards Organization shall ensure the EMS policy includes a commitment to:

1. Prevention of exports of Hazardous Electronic Waste (HEWs) throughout the Recycling Chain which violate international laws, treaties, and agreements,
2. Prohibition of forced or child labor throughout the Recycling Chain,
3. Prohibition of prison operations throughout the Recycling Chain that involve incarcerated individuals handing HEWs or Customer Data, and:
   - Are subsidized by government (directly or indirectly),
   - Involve the likelihood of risks of release or misuse of Customer Data, or
   - Do not provide workers with the same rights as private sector workers to protections from exposure to toxics, and
4. Social accountability values within its Organization consistent with the principles of SA 8000 (certification to SA 8000 is encouraged but not required).

The EMS policy shall be communicated to all persons working for the e-Stewards *Organization and shall be made available to the general public,* and shall encourage all Downstream Processors to operate consistent with the principles of SA 8000.

4.3 Planning

4.3.1 *Environmental* and Stewardship *Aspects*

The e-Stewards *Organization shall develop and maintain a process and procedure*

a) *to identify* Stewardship *and environmental Aspects of its operations,* including those that arise from the requirements of this Standard, *within the scope of the EMS under its control and influence, and for any new developments or altered operations, and*

b) *to determine those* Stewardship *and environmental Aspects that have significant impact or potential for significant impact on the environment,* the health and safety of those impacted by the operations[14], and the data privacy of customers,

c) Conduct a risk assessment

At least every three years, conduct and document a risk assessment of the Organization's Environmental and Stewardship Aspects associated with all forms of Electronic Equipment and its management. The health and safety portion of the assessment shall be conducted by an Occupational Environmental Health and Safety Professional(s). The assessment may require a multidisciplinary team to address all potential hazards. Additional risk assessments shall be conducted on specific operations or areas prior to and following any significant changes.

The risk assessments shall take into account the Organization's Environmental and Stewardship Impacts and the results of monitoring activities (4.5.1), and shall give consideration to:

1. Customer Data privacy, downstream risks associated with Hazardous e-Waste and hazardous waste management, releases to the environment such as storm water runoff and air emissions, and transportation,
2. Physical hazards, including noise (impact, continuous, and intermittent), ergonomic hazards, vibration, lighting, and temperature extremes,
3. Chemical hazards in the form of vapors, dust, fumes, or radioactivity, whether from the hazardous substances present in Electronic Equipment or processes used to manage it, both in operational areas and in areas where hazards may migrate (e.g. offices, changing rooms, dining and break rooms). Examples of chemical hazards include, but are not limited to lead, mercury, cadmium, Phosphors, beryllium, and brominated flame retardants,
4. Biological hazards, e.g., blood that is present in used glucometers, or microorganisms in medical Electronic Waste,
5. The following practices, in order to decrease worker exposure and take home contamination (potentially exposing others outside the workplace):
   - Housekeeping practices in the workplace (disallowing practices such as dry sweeping dust, and using compressed air to clean surfaces),
   - Work practices of individual workers, and
   - Personal hygiene practices, e.g. washing or showering adequately for removal of contamination prior to eating, taking a break, and/or leaving the work area,

[14] This includes workers, temporary workers, supervisors, consultants, auditors, volunteers, any others performing work for the Organization, as well as the surrounding community.

6. Trends or continued risks as documented in records of past injuries, accidents, and workplace monitoring records in order to determine if earlier risks have be adequately addressed and reduced, and

7. Other hazards including hazardous substances that may be present in the Electronic Equipment, non-conforming (unusual incoming) materials, and in other products or processes used in operations (such as solvents, cleansers, and solder guns), and

d) Identify and prioritize significant Environmental and Stewardship Aspects

The Organization shall identify, determine significance of, and prioritize its Environmental and Stewardship Aspects, taking into account their associated severity and frequency, the results of the risk assessment(s), stakeholder concerns, legal and other requirements (4.3.2), and environmental, health and safety monitoring results (4.5.1). *The Organization shall record this information and keep it current.*

Significant Environmental and Stewardship *Aspects* and other risks and obligations that arise from the requirements of the complete e-Stewards Standard *shall be taken into account in the development and management of the* e-Stewards *Organization's EMS.*

4.3.2 *Legal and other requirements*

The e-Stewards *Organization shall develop and maintain a process*

a) *to determine and acquire legal requirements that apply to their operations and other applicable requirements followed by the Organization concerning its Environmental* and Stewardship *Aspects,* contractual agreements, and each policy commitment (4.2),

b) *to show how these apply to its* Stewardship and *Environmental Aspects,*

c) to identify, obtain, and maintain all required national, state/provincial and local permits covering specific operations, limitations, and controls, and

d) to implement all local, state/provincial, and national requirements for environment, social accountability, occupational health and safety, and data security.

The e-Stewards *Organization shall demonstrate how such requirements are considered in developing and maintaining its EMS.*

4.3.2.1 Legal Export, Transit, and Import Requirements

An Organization shall ensure legal transboundary movement (export, transit, and import) of used Electronic Equipment destined for reuse and of each Hazardous e-Waste (and of some Problematic Compounds or Materials as noted in 4.4.6.7), coming into their facility(s), under their Control, and throughout their Recycling Chain, by identifying and ensuring consistency with all relevant legal and other requirements, including:

a) The requirements of:

1. The Organization for Economic Cooperation and Development (OECD),

2. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal,

3. The Basel Convention Decision III/1, also known as the Basel Ban Amendment, regardless of whether or not it is in legal force nationally or internationally,

4. Other applicable international laws regarding trade (export, transit, or import) in hazardous wastes, including regional treaties and accords (e.g. the Waigani Treaty, Bamako Convention, Izmir Protocol, Central American Accord, EU Waste Shipment Regulation), and
5. National legislation of any countries concerned (export, transit, and import), including laws pertaining to tested and Fully Functional used equipment, and restrictions on older equipment, and

b) Ensuring that each shipment of Hazardous e-Waste is exported or imported only as follows:

1. Implementation of Basel Ban Amendment [a) 3 above]: When exported from OECD/EU countries and Liechtenstein, shipments shall only go to and through countries in that same group, and the trade is for Recycling and not Final Disposal,

2. Implementation of trade ban between Basel Parties and non-Parties[15]: All countries concerned (export, transit, and import) must be Parties to the Basel Convention, unless at least one of them is a Basel Party and all countries concerned have concluded a valid special bilateral or multi-lateral agreement as allowed under Article 11 of the Basel Convention, and

3. Implementation of the Basel Convention, regional agreements, and national laws: If trade (export, transit, and import) is not prohibited under 1and 2 above[16], it shall be conducted only in full conformity with all applicable legal and other requirements including national and regional agreement requirements, as well as with the requirements of the Basel Convention. These requirements include contacting government Competent Authorities[17] and obtaining national government-to-government written approval from the exporting, transiting, and importing countries prior to the export of each shipment[18]. The Basel Convention also requires recognition of national definitions of hazardous waste for any country concerned (export, transit, and import) as submitted to the Basel Convention Secretariat.

4.3.3 *Objectives, targets and programme(s)*

Environmental management system objectives shall be identified and documented, including those pertaining to health & safety and data security, *and responsibilities and methods for achieving targets and goals shall be defined, including timing for such achievement.*

Objectives shall measurable whenever practical, and shall be consistent with the e-Stewards' policies.

When setting up and reviewing its objectives and targets, an Organization shall consider its legal and other requirements, and its significant Stewardship *and Environmental Aspects*, including those associated with the requirements of this Standard. *Technological options, operational and business requirements, and the views of stakeholders shall be considered.*

The e-Stewards *Organization shall operate a program for achieving its goals and targets including identifying who is responsible for setting and achieving the goals and targets at various levels of the Organization, and how and when they will be achieved.*

[15] Basel Convention, Article 4, Paragraph 5; www.basel.int (NOTE: USA is not a Basel Party as of date of publication of this Standard.)

[16] e.g., for trade between two non-OECD and non-Basel Parties

[17] For a list of Competent Authorities of Basel Parties, and their contact information, see: http://www.basel.int/Countries/CountryContacts/tabid/1342/Default.aspx

[18] The Basel Convention, OECD and other agreements may allow a country to provide "general consent' for periods of time, based on a number of conditions.

4.3.4 Planning for responsible management & disposition of Electronic Equipment

The Organization shall document and implement a plan for the responsible management and disposition of Electronic Equipment received by the e-Stewards Organization or under their Control in a manner that protects human health and the environment, and is in conformity with this Standard. The plan shall identify:

- Electronic Equipment that is accepted, items that are not accepted, and how to manage unusual materials if received,
- The hazardous substances that may be in Electronic Equipment, including HEWs,
- Priorities for managing Electronic Equipment based on the Figure 3. Waste Management Hierarchy, and as appropriate to business model and customer requirements,
- Potentially Hazardous Processing Technologies employed,
- Operational controls for management of HEWs, PCMs, and their residuals in accordance with this Standard, and
- Acceptable downstream Processing options, countries, and Final Disposition for HEWs, PCMs, and residuals.

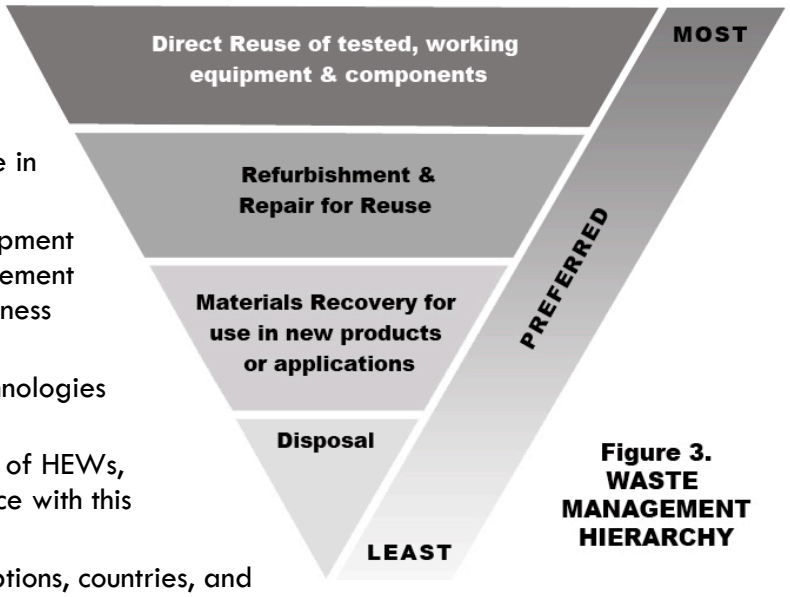


Figure 3. WASTE MANAGEMENT HIERARCHY

4.4 Implementation and operation

4.4.1 *Resources, roles, responsibility and authority*

An e-Stewards *Organization's top management shall provide resources (human, technical, and financial) for the effective and efficient operation of the environmental management system and achievement of its goals.*

For human resources, roles shall be clearly defined, including responsibilities and authorities assigned to each. An environmental management system representative shall be designated by the highest level of management, and their role shall include:

a) Ensuring the environmental management system functions effectively and efficiently in conformance with the complete e-Stewards Standard, *and*

b) Access and reporting to the highest level of management on the performance of the EMS against its objectives.

4.4.2 *Competence, training and awareness*

An e-Stewards *Organization shall ensure that all personnel who are responsible for achieving the requirements of* the complete e-Stewards Standard *are qualified on the basis of job training, work experience, and/or education.*

Awareness and job training shall be provided and documented for employees whose jobs relate to the Organization's environmental, occupational health and safety, and data security *aspects and impacts and EMS. This training shall address the critical nature of conformance with policy and procedures, identification of those aspects and impacts which may be associated with their jobs, their specific roles in*

achieving conformity, and the potential results of not achieving conformity, including potential risks and controls arising from the introduction of new Processes and/or new materials.

4.4.3 *Communication*

An e-Stewards *Organization shall effectively communicate internally regarding its defined Environmental* and Stewardship *Aspects and Impacts and the requirements of its environmental management system,* including ensuring that all training and other communications to workers are made in a language and format understandable by the workers (e.g. tailored to literacy levels).

External communications about its significant environmental aspects and conformity to the complete e-Stewards Standard *shall be considered, and a method for this transparency shall be implemented, as appropriate,* including reporting emergency events and exceptional releases of toxics or other hazards to appropriate authorities.

4.4.3.1 Participation and Communication

The Organization shall establish and maintain a participation and communication program:

a) For workers

The Organization shall communicate with workers regarding the Environmental Management System, including but not limited to:

1. Conduct and document regularly scheduled safety and health meetings,
2. Ensure workers and contractors are consulted and informed regarding issues and changes that may affect their occupational health and safety,
3. Communicate environmental, health and safety information, as allowable by law, including:
   - Industrial Hygiene monitoring results for each affected work position, without identifying any affected workers, as well as communicating a clear explanation of what the results mean, and
   - Timely and confidential communication of Industrial Hygiene and medical monitoring results with each affected worker with clear interpretation of these results, including whether or not workers have been exposed to levels at which the Organization is required by law or this Standard to mitigate,
4. Establish and maintain an ongoing occupational and environmental health and safety team in order to ensure regular communication between and participation of representatives of all levels of workers and management regarding environmental, health, safety, and social accountability issues, which:
   - Facilitates two-way communication between workers and management, without fear of reprisal (e.g. via a system to accept anonymous tips or concerns),
   - Regularly reviews environment, health and safety suggestions, complaints, concerns, reports of safety violations, and exposure data,
   - Allows workers and supervisors to participate in hazard identification, risk assessments, and incident investigations,
   - Reviews effectiveness of controls, and makes recommendations to management review (4.6) meetings for improvements to system processes and operational controls,
   - Provides workers with the authority to discuss recommendations and implement actions for environmental protection, health and safety, and social accountability, and

- Regularly reviews non-conformities and the effectiveness of closure (completion) of corrective and preventive actions (4.5.3),

b) For Customers

If requested by customers, including upstream e-Stewards Organizations, the Organization shall provide, or allow review of, verifiable records of:

1. Hazardous e-Waste going for Recycling or Final Disposal, including Hazardous e-Waste generated by Repair/Refurbishment operations. Records shall include current contact information for Downstream Processor(s) through Final Disposition, and
2. Equipment and components going for reuse, up to the point of completing requirements for reuse in conformity with 4.4.6.2. Records shall include dated sales orders or invoice numbers, but do not need to include names of buyers.

Should the customer require extensive detailed documentation, provision of such information may be contractually negotiated and controlled.

4.4.4 *Documentation*

In addition to the requirements for documentation made elsewhere in the complete e-Stewards Standard, *an e-Stewards Organization's EMS shall document:*

a) The scope and core elements of the EMS,

b) A description of the interaction between the core elements of its management system, and reference the related procedures,

c) Records which provide evidence of conformance with the complete e-Stewards Standard, *and*

d) Procedures and records that may be necessary to ensure effective planning, implementation, and control of its significant environmental aspects and impacts.

4.4.5 *Control of documents*

Where documentation is a requirement of the complete e-Stewards Standard *and/or the EMS, documentation (including externally generated documents) shall be controlled, including an effective process to*

a) Approve documented procedures and revisions,

b) Ensure that current revision levels are identified and relevant versions are available wherever required to assure conformity,

c) Ensure document identification, legibility, and known distribution, and

d) Prevent the unintentional use of superseded documents.

4.4.6 *Operational control*

An e-Stewards *Organization shall identify, plan, and perform operations essential to the effective implementation of the environmental management system by*

a) Utilizing and documenting procedures, including operating criteria, where the lack of procedures could lead to nonconformance with the e-Stewards *EMS policy and objectives, and*

b) *Communicating any relevant process requirements to customers and/or suppliers related to significant Environmental* and Stewardship *Aspects.*

4.4.6.1 Eliminate and mitigate significant Environmental and Stewardship Aspects

An Organization shall establish, implement, and maintain a documented program and procedures to address its Environmental and Stewardship Aspects, including an occupational health & safety and Industrial Hygiene program to:

- Protect workers from injury and illness,
- Reduce or eliminate workplace hazards and exposure to hazardous materials, and
- Protect workers' rights for health and safety.

This program shall include a precautionary approach, shall address priority hazards and respond quickly to emerging information about new concerns, and shall give preference to the following hierarchy of controls, in this order: elimination, substitution, engineering, administrative, and finally personal protective equipment. The ongoing occupational health and safety and Industrial Hygiene program shall include, but not be limited to, the following:

a) Airborne hazard controls

Based on the results of the risk assessment (4.3.1) and testing for each airborne hazard[19] (4.5.1.2), establish and maintain controls to mitigate exposures in the operational areas and to prevent migration of hazards outside the operational areas. This shall include controls according to the hierarchy of controls outlined above to maintain air quality and prevent releases, under the direction of competent personnel and effectively reduce or eliminate exposures, as required below.

The e-Stewards operational occupational exposure limit (OOEL) for each identified hazard shall be either the applicable regulatory limit in the jurisdiction of the Organization or the current Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists (ACGIH). In order to foster best practices, Organizations are encouraged to adopt the lowest, most protective limits. If there are not regulatory limits for any particular hazard in the country concerned, then only the ACGIH TLV shall apply.

In addition, the following controls shall be implemented:

1. If results are equal to or exceed 100% of the OOEL (described above) in the Organization's jurisdiction, urgently implement appropriate measures in accordance with the hierarchy of controls above. The Organization shall take timely action to protect workers when elimination, substitution, and/or engineering controls are not immediately feasible or effective in reducing exposures to acceptable levels,

2. If results exceed any regulatory action levels (i.e. levels at which mitigation is legally required prior to reaching legal exposure limits), then implement control measures in accordance with the hierarchy above to reduce and maintain worker exposures below the action levels, as soon as possible, and

3. If there are no regulatory action levels (i.e. no requirements to mitigate prior to exceeding the legal exposure limits), and test results are equal to or above 50% of the OOEL, the Organization shall establish objectives (4.3.3) to address these airborne hazards as soon as possible,

[19] It is important to note that the lack of an occupational exposure limit for a substance does not imply that the substance is safe or not hazardous.

b) Housekeeping

Establish and implement an ongoing housekeeping program for all areas to prevent or mitigate physical hazards (such as slips, trips and falls), and avoid or minimize secondary routes of exposure (such as ingestion or dermal absorption) to chemical and biological hazards. Non-operational areas shall be kept free of harmful substances that may migrate from operational areas and cause increased exposures and take home contaminants,

c) Ergonomic controls

An ergonomics program shall be established, documented, implemented, and re-evaluated at least every 3 years and when significant changes are made in work processes to address the risks identified in the ergonomic evaluation (4.3.1 c). If past injury reports and activities identify a strong likelihood that workers have suffered or will suffer musculoskeletal disorders, the Organization shall take further steps to prevent these,

d) Noise controls

A documented hearing conservation program shall be established, as needed, after comparing noise test results (4.5.1.2) to the most stringent regulatory exposure limits within the Organization's jurisdiction or if none, to those in an OECD country. The program shall:

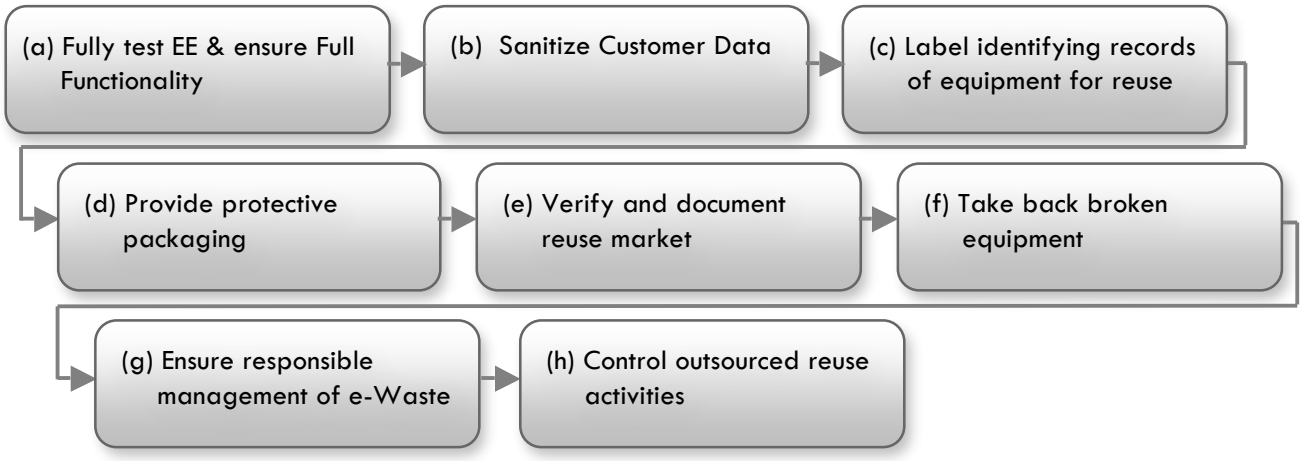
1. Evaluate and implement feasible engineering and administrative controls to reduce worker noise exposures in the event that noise levels are above either 85 decibels (time weighted average) or the applicable regulations or standard, whichever is more protective,
2. Ensure that hearing protective devices are worn by all affected workers while and until effective engineering and administrative controls are implemented, and retesting confirms effectiveness, and
3. Complete audiometric testing (gauging long term impacts) for all affected workers in the event that engineering/administrative controls take a year or longer to implement, and

e) Controls for significant Environmental and Stewardship Aspects

Establish, implement, and document formal procedures for significant Environmental and Stewardship Aspects, in order to mitigate and minimize environmental releases, worker and community exposures, take home contamination, data privacy risks, and have the necessary equipment and capacity on-site to implement these procedures.

4.4.6.2 Reuse and Refurbishment of Electronic Equipment

The Organization shall ensure that Electronic Equipment that is donated, transferred, and/or sold for reuse, throughout Final Disposition, according to the following requirements (details below):



a) Fully test Electronic Equipment and ensure Full Functionality

The Organization shall determine that Electronic Equipment, including components, which contain or consist of HEEs and/or PCMs are Fully Functional, with exceptions defined in Table 1 below, by testing each item to determine its condition, Repairing/Refurbishing as needed, and ensuring they are Fully Functional prior to going for Direct Reuse.

In addition, the Organization shall:

1. Determine and document the state of health of each rechargeable battery[20] destined for reuse from mobile computing devices, including laptops, notebooks, e-readers, and touch-pads, as follows:
   - Recharge battery and ensure it will accept a charge, and
   - Test each battery that will accept a charge (whether it is part of a device or separate), and allow such batteries to go into reuse if:
     - The full charge capacity on the 'smart chip'[21] displays a value of 80% or greater than the original rated capacity[22] of the battery, or
     - Each recharged battery maintains a run time[23] of at least one hour during 'load testing'[24] at 60% of the battery's original load rating[25] or a mathematically equivalent load test protocol,

[20] This does not include rechargeable batteries in small wireless peripherals, such as wireless track pads, mice and keyboards.

[21] While there is no single definition for 'smart chip', integrated circuit chips standardized in 1993 contain smart battery systems designed to indicate 'state of charge', and provide both permanent and temporary data. Battery manufacturers program the permanent data into the battery, which includes battery identification, type, manufacturer's name, serial number and date of manufacture. The temporary data is regularly added to during battery use and consists of cycle count, user pattern, and maintenance requirements. It is not permissible for an Organization to reset the value on the smart chip.

[22] Battery capacity is a measure (typically in Amp per hour) of the charge that can be stored by the battery in its present condition. There are various testing protocols for determining the capacity of a battery and its state of health. Battery manufacturers typically state the rated capacity of new batteries on the battery labels, in terms of milli Amps per hour (mAmps).

[23] The time for the battery to fully drain is recorded, with at least 1 hour run time available from the battery (when not plugged into electrical grid).

[24] 'Load testing' refers to the actual usage or electrical demand placed on an electronic device (such as a laptop) during the battery test. All of the following can affect the 'load' (energy demand) on a device, while in use: screen brightness, type of programs, type of activity, temperature, and wireless features.

[25] i.e. 60% in milli Amps (mAmps) of the original milli Amp Hours (mAh) rating of the battery. For example, for a battery rated at 4,000 mAh, the required load would be 2,400 mAmps (60% of its original [new] rated output) with one hour run time before the electronic device shuts down.

2. Determine the state of health of each mobile phone battery destined for reuse[26], ensuring that it is capable of holding a charge of at least 80%[27] of its original rated capacity[28]. This should be accomplished by the following:
   - Recharge each battery (at least 30% recharged) and then perform a 'quick test' (e.g. with a quick sort analyzer) if a reliable quick test[29] is available for battery type, or
   - Fully charge and discharge the battery to measure its current capacity,
3. Determine that photo voltaic modules destined for reuse are capable of producing power output that is at least 50% of original power output, and
4. Test CRT devices that are destined for remanufacturing[30] as follows:
   - Test each cathode ray tube for viability[31] and ensure only reusable tubes are transferred for remanufacturing, and
   - Do not allow other components that consist of or contain HEE (such as circuit boards) to be transferred to remanufacturing operations if those materials will be Recycled or disposed of, or if they are destined for reuse and have not met the requirements in this section 4.4.6.2.

Table 1: Electronic Equipment that does not have to be tested for Full Functionality (4.4.6.2 a), if it meets these requirements

Type of Electronic Equipment exempt from Full Functionality requirements (4.4.6.2 a)	Requirements for this type of Electronic Equipment, prior to going for reuse
1. New equipment or components still in unopened original packaging	The Organization shall determine that the devices are not known or suspected to be defective nor the subject of a product recall, and demonstrate the Organization has clear title and authority to sell such products.
2. New components (parts) in their original packaging which has been opened in order to remove some but not all of the new components	The Organization shall determine that the devices are not known or suspected to be defective nor the subject of a product recall, and demonstrate the Organization has clear title and the authority to sell such products. In addition, this exemption is only for components/packaging for which it can be demonstrated that the components are brand new, even if packaging has been opened.

[26] Unless mobile phone is Repurposed to a use that does not rely on the battery.

[27] This parameter was defined by participants in the United Nation's Mobile Phone Partnership Initiative (MPPI), including industry participants; http://www.basel.int/industry/mppi.html

[28] See footnote 23

[29] If using a pass/fail analyzer, it must be set at a minimum threshold of 80% for all batteries indicated to "pass" the quick test.

[30] e.g. removing a cathode ray tube (CRT) from a used device and building a new device/product incorporating the old tube.

[31] E.g., using a CRT picture tester/restorer.

Type of Electronic Equipment exempt from Full Functionality requirements (4.4.6.2 a)	Requirements for this type of Electronic Equipment, prior to going for reuse
3. Used Electronic Equipment which is very unusual[32] and the total Annual sales/value of which equals 5% or less of the Organization's total Annual sales and/or value of donations.	The Organization, but not their End Refurbisher(s), may sell and/or donate up to this limited quantity of unusual items without ensuring Full Functionality, if they complete all of the following: ▶ Establish & implement documented procedures for meeting the requirements of this exemption, including restrictions on quantities, clear criteria for identification of limited types of Electronic Equipment, as defined, and accepting returns, ▶ Ensure all such Electronic Equipment is only exported, directly or indirectly, in conformity with section 4.3.2.1 (Legal Exports), ▶ Prior to transfer of exempted Electronic Equipment, perform and document a thorough physical inspection of each unit and ensure the equipment/component is not damaged and appears to be in good working order or is repairable, ▶ Clearly state on all advertising and invoices related to the sale or donation of each exempted item that it is: ▶ Not fully tested for functionality, and provide full disclosure of inspection results and condition, ▶ For Repair/Refurbishment, and not Recycling or disposal, ▶ Warranted for at least 90% money-back, ▶ Keep the following records: ▶ Unit and total value of Electronic Equipment donated and/or sold, and exempted in this subsection 3 of Table 1, and ▶ Number or weight of units and/or parts returned.

b) Sanitize all Customer Data in conformity with 4.4.6.3 (Data Security),

c) Label or list identifying records for each item of Electronic Equipment

The Organization shall provide and maintain identifying information for each item of Electronic Equipment (including components) destined for reuse, except for integrated circuits and random access memory (RAM). The identifying information shall be conveyed via either a label attached to each item and/or a list of items in each lot or shipment, and shall be easily accessible to officials (e.g. customs officers) and customers without the need for unpacking. Identifying information shall include:

1. Type of device or component,
2. A unique identification number[33] of whole devices (and/or components if they are sold or donated separately and if they have identification numbers),
3. Year of production (if available) and model number (if available),
4. Manufacturer or brand name,

[32] i.e. Electronic Equipment which in not generally handled by the Organization and is very difficult to fully test due to the need for rare and highly specialized skills, specialized software or testing equipment, and/or rare and unavailable parts. Such unusual equipment may include obsolete (vintage), medical, manufacturing and testing equipment, but not equipment commonly available, or frequently managed by the Organization.

[33] The identification number can be a serial number affixed to a device or component by the manufacturer, or a similar unique number assigned to the specific device or component, distinguishing it from devices of similar make or model.

5. Type of testing performed on each device or separate component and, if applicable, data sanitization (see 4.4.6.3),
6. Result of tests performed, an accurate representation of the condition of the device or component (including cosmetic condition), a description of missing components (if applicable), confirmation that all equipment and/or components are Fully Functional (except for exempted equipment), and a clear representation that it is a used device or component (unless it is new and still in original packaging),
7. Information on rechargeable batteries for mobile computing devices, as follows [see Appendix A 4.4.6.7 b) for additional documentation required for exports]:
   - When a battery is shipped with the computing device it powers and is Fully Functional [4.4.6.2 a) 1], information for each battery indicating test results, i.e. that it has at least 80% of original capacity, and the battery shall be associated with the device,
   - If batteries destined for reuse are not shipped with the computing devices each battery will power (e.g. separated, bulk batteries), identifying information for each shipment shall include all the information in the bullet point above, as well as weight, count, and model number for each type of battery chemistry in a shipment,
8. Information on rechargeable batteries for mobile telecommunications devices indicating that each battery is Fully Functional [4.4.6.2 a) 2], i.e. has at least 80% of original capacity [see Appendix A 4.4.6.7 b) for additional documentation required for exports],
9. Name, address (including country), and current contact information of the Organization (and their End Refurbisher, if applicable) responsible for evidence and confirmation of Full Functionality, and
10. Product return policy,

d) Provide protective packaging

The Organization shall package Electronic Equipment destined for reuse in a manner that will safeguard its reusability, public and worker health, the environment, and protect it from damage during loading, transit, and unloading,

e) Verify Direct Reuse market

The Organization shall confirm that every sale or donation of Electronic Equipment and components is destined for Direct Reuse, and not for Recycling (including repair) or Final Disposal, by documenting and maintaining:

1. A copy of the contract, invoice, or receipt relating to the sale and/or transfer of ownership or equipment, which states:
   - The name and address of the buyer/receiver, including country[34],
   - That the equipment or components are Fully Functional (or in the case of exemptions found in 4.4.6.2 a) Table 1, required records), and
   - That the equipment or components are being sold, donated, and/or received for Direct Reuse,

[34] Alternatively, tested and Fully Functional equipment and components (4.4.6.2.a) may be sold for reuse without proof of reuse market if the Organization documents and implements a procedure to show that the selling price is at least three times more than the prevailing scrap for each sale. In this case, the Organization shall obtain and maintain a) objective evidence of the prevailing scrap rate at the time of sale for each type of tested and Fully Functional equipment and/or components sold, and b) the weight of the equipment and/or components, their selling price, and a calculated price per unit of weight.

2. Bills of lading/waybills and/or other relevant Shipping Records, if shipping is involved, with both the buyer/receiver and seller/donor listed,

f) Take back Hazardous Electronic Equipment

The Organization shall always accept back, free of charge, equipment and/or components which originated from the Organization's facility or Control if they were misrepresented to the customer, and/or if they are comprised of or contain Hazardous Electronic Equipment but were subsequently determined to be non-functional, including those broken during shipment or significantly different than described,

g) Ensure responsible management of resulting e-Waste

All scrap, e-Waste, and material generated from Repair/Refurbishment activities that meet the definition of HEWs and/or PCMs shall be managed according to the applicable requirements for such materials in this Standard, and

h) Control outsourced reuse activities

If outsourcing any reuse tasks (4.4.6.2), retain full responsibility for all outsourced tasks and establish, implement, and maintain a system of controls to ensure that the Organization:

1. Only transfers Electronic Equipment to End Refurbishers that are Immediate Downstream Processors and that complete[35] all applicable requirements in this section (4.4.6.2), except as allowed in the note below,

2. Assumes that Electronic Equipment which is being exported for Repair/Refurbishment is Hazardous e-Waste and the Organization only transfers it to End Refurbishers in conformity with export requirements (4.3.2.1 and 4.4.6.7), unless there is objective evidence accompanying each shipment that it contains no HEEs, and

3. Ensures that all scrap and e-Waste generated by the Repair/Refurbishment Process is managed in conformity with 4.4.6.4 (Responsible Management of Electronic Equipment), 4.4.6.5 (Downstream Accountability), 4.4.6.6 (Final Disposition), and 4.4.6.7 (Export).

NOTE: If outsourcing ink and toner cartridges for remanufacturing, the Organization may allow their End Refurbisher to further outsource cartridge remanufacturing if the Organization verifies that the End Refurbisher (i.e. the Organization's Immediate Downstream Processor):

- Outsources cartridge remanufacturing tasks to their next tier remanufacturer who shall not further outsource tasks and shall complete them in conformity with the Organization's requirements in 4.4.6.2,
- Performs a thorough visual inspection of all cartridges prior to transferring them to a next tier remanufacturer, and only sends cartridges which appear viable for remanufacturing and are packaged in a manner that prevents leakage and spills of inks and/or toners during handling, storage, and transport, and
- Executes a written agreement with their next tier remanufacturer to only sell or donate tested, working ink and toner cartridges and dispose of the resulting wastes according to 4.4.6.6 (Final Disposition) and 4.4.6.7 (Export).

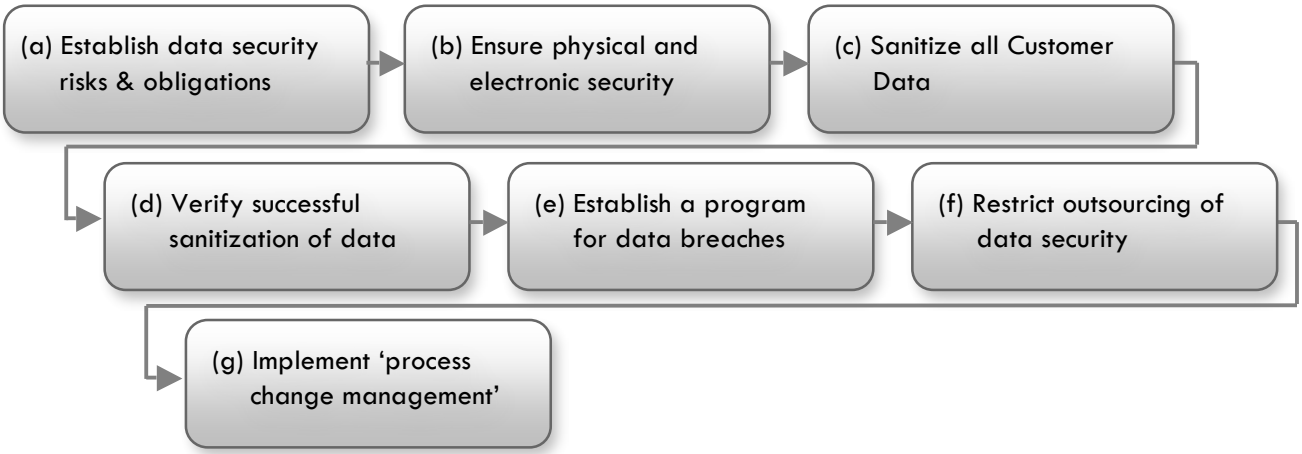
4.4.6.3 Data security

The Organization shall prevent unauthorized access to or release of any Customer Data, regardless of whether data storage devices are going for reuse, Materials Recovery, or Final Disposal. The Organization shall offer data security services in-house and/or under their Control, and shall retain

[35] i.e. do not further outsource any reuse tasks

responsibility for protecting and preventing unauthorized access to or release of Customer Data, regardless of whether or not the Organization outsources any of the associated activities.

The following is an overview of additional data security requirements, described in more detail in the following sections:



The Organization shall develop, document, implement and maintain a system of procedures and controls that includes the following:

a) Establish and communicate data security risks and obligations

Inform customers of data security risks, and communicate in writing with customers the Organization's explicit role, service obligations and agreements, and customer indemnifications, if any, regarding the data security services that are and/or are not provided. In addition, for customers that are utilizing the Organization's data security services, this includes communication of:

1. Types of assets and other material for which the Organization is sanitizing data,
2. Method(s) by which data sanitization shall be accomplished, e.g. software-based media overwriting processes, degaussing, and/or physical destruction of media,
3. Any additional information the customer has required the Organization to sanitize (i.e., in addition to Customer Data, e.g. asset tags and customer logos),
4. Data security standard(s) that is achieved in securing and sanitizing Customer Data,

b) Ensure physical and electronic security

Develop, implement, and maintain written procedures for physically securing data storage devices, and data processing systems used in the delivery of data security services[36]. The Organization shall establish, implement, and maintain controls to physically and electronically protect all Customer Data until it is sanitized (or returned to the customer), whether data storage devices[37] are going for reuse, Materials Recovery, or Final Disposal, for each device throughout the chain of custody. This system of controls shall:

1. Identify the data-bearing characteristics of the assets types for which they provide services, on an ongoing basis,

[36] While this Standard does not require certification to the ISO 27002-2005 Code of Practice for Information Security Management standard, Organizations are encouraged to pursue such certification.

[37] This includes solid state drives and hybrid drives

2. Establish and document a clearly defined chain of custody for Customer Data, including the following:
   - Stipulate when and where the transfer of custody to the Organization begins and ends for Customer Data, i.e. until it is sanitized (including destruction),
   - Provide secure logistics for data security, including the transport of customer/user assets to the Organization's facility(s), between the Organization's own facilities, and/or to the End Refurbisher(s), and maintain effective physical and electronic controls throughout the transport and transfer processes, and
   - Ensure that any locations where customer assets may be temporarily stored during the Organization's transport and transfer processes operate under a comparable set of security requirements as defined in 4.4.6.3. b) 3 below,
3. Provide effective controls to physically and electronically secure facilities and equipment, in order to:
   - Ensure that only authorized personnel are allowed access to areas where Customer Data is stored and where data security services are performed,
   - Isolate areas where data security services are performed from locations where unauthorized people can enter the property, such as loading and unloading areas,
   - Prevent data from being electronically accessible, even if physically controlled, and
   - Restrict or control entry and exit of authorized guests in secure areas, as appropriate,
4. Implement controls to mitigate data security risks associated with workers, including but not limited to background verification checks on all workers and temporary service providers who are involved in the delivery of data security services, and
5. Establish effective inventory control by documenting and tracking the custody of all data storage devices and sanitization activities on them, including:
   - Clearly identify all equipment and components that require data security services either by using a manufacturer-designated serial number or assigning a unique number for each device, or by designating secure accumulation areas for non-serialized data storage devices,
   - Document their physical location and data security status throughout the chain of custody,
   - Implement handling procedures to ensure inventory integrity until data sanitization is complete, to prevent access to accumulated media, and track accumulation containers' physical locations until Customer Data is sanitized (e.g. media destruction), and
   - Provide inventory tracking information to customers regarding their data storage devices and sanitization status, and allow customers to audit inventory tracking processes, upon their request,

c) Sanitize all Customer Data (such as purging, clearing, or destroying data storage devices)

Unless otherwise requested by the customer in writing, effectively sanitize all Customer Data prior to leaving the Organization's Control[38], so that data storage devices are permanently unusable, unreadable, and/or indecipherable, including solid state and hybrid drives, in accordance with 4.3.2

[38] Organizations and/or their End Refurbishers may sanitize data storage devices in a mobile environment, such as in a vehicle designed to provide data security and destruction, if the vehicle, its equipment, and processes meet e-Stewards requirements for data security and protect human health and the environment.

Legal and Other Requirements, including written customer requirements. This shall be achieved by conforming either to a published national standard for data security in the country or region in which services are being delivered or with the current version of NIST Special Publication 800-88 Guidelines for Media Sanitization, whichever is more stringent. The Organization shall ensure that all data storage devices sold or donated for reuse have been sanitized of Customer Data and that:

1. Licensed software has been permanently removed unless the device is being returned to software licensee, or is legally transferred,
2. Devices are physically destroyed if data sanitization requirements of this section 4.4.6.3 cannot be met. Thresholds for physical destruction shall be established for the quantity of addressable locations whose failure prevents data elimination through overwriting, and
3. Paper and other media containing Customer Data, such as letterhead paper, logos, or tags/stickers, are removed from equipment and components, including from internal paper pathways of imaging equipment,

d) Verify successful sanitization of Customer Data, whether clearing, purging or destroying data storage devices

The Organization shall:

1. For all data storage devices going for reuse, verify that prescribed overwrite instructions have been successfully executed for 100% of a device's physical memory locations. Where the prescribed overwrite instructions cannot be executed successfully for all physical memory locations (i.e., failed sectors), logging shall include identification of these locations, and shall account for 100% of the media's physical memory locations or shall result in the logged destruction of the 'failed sector' drives/storage devices,
2. For all data storage devices going for destruction (including Materials Recovery and/or Final Disposal), verify physical destruction processes are completed via a 'validation of process' execution,
3. Provide verification records of successful sanitization for each serialized device and/or for each container of non-serialized data storage devices, or if allowed by the customer, successful sanitization of batches of their data storage devices,
4. Perform regular internal review of risk mitigation processes, to identify and mitigate points-of-failure, and improve process capability and durability[39], and
5. Verify and log information to customers for their data storage devices upon their request, except as contractually stipulated, and allow customers to audit data destruction verification and logging processes,

e) Establish a program for data security breaches

An Organization shall establish and implement procedures to prevent, detect and respond effectively and quickly to information security breach[40] incidents. Should there be a data security breach, the Organization shall:

1. Inform relevant authorities in a timely manner,
2. Report the breach to the impacted customer(s) in a timely manner, and

[39] "Durability" refers to the ability to perform a designed function for an extended length of time.

[40] "Breach" refers to the intentional or unintentional release of Customer Data and/or private information to an unapproved party or environment.

3. Collect evidence from the time that a security breach is initially detected, retain and present it in conformity with the rules of evidence in the relevant jurisdiction(s), if the security breach incident involves legal action (civil or criminal),

f) Restrict outsourcing of data security

If outsourcing any data security tasks, an Organization shall retain responsibility for Customer Data and shall implement, operate, and maintain a documented system of controls that:

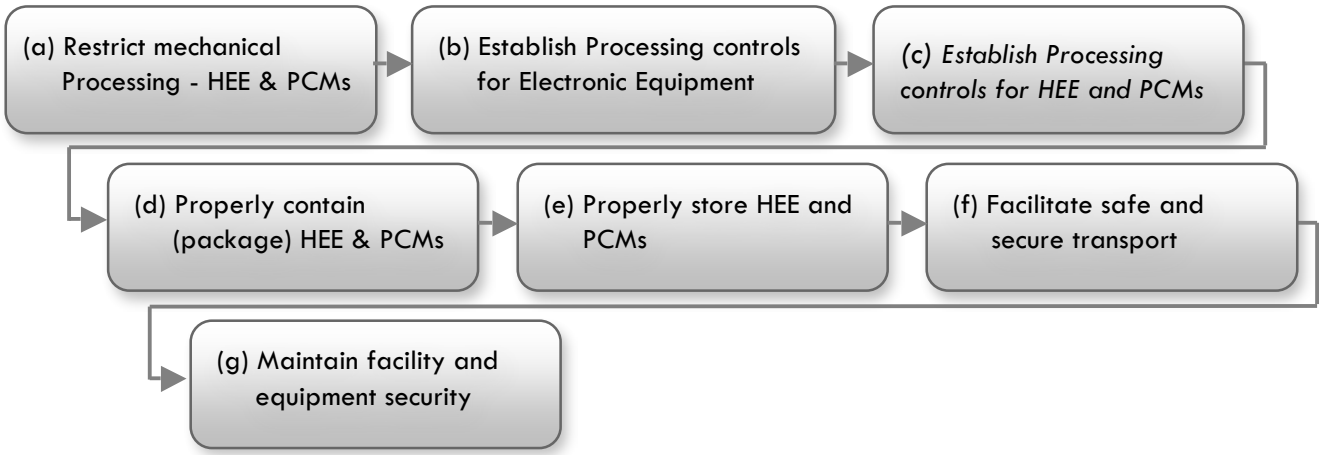
1. Allows outsourcing only to Immediate Downstream Processors that are End Refurbishers,
2. Ensures that the End Refurbisher completes and conforms to the applicable requirements in sections 4.4.6.2 (Reuse) and 4.4.6.3, and does not further outsource any of these tasks, and

g) Implement documented 'process change management' procedures

An Organization shall establish and implement a documented management-of-change procedure to document, train workers, and communicate changes in the performance of data security services, and notify customers of such changes in a timely manner.

4.4.6.4 Responsible management of Electronic Equipment

An Organization shall manage all Electronic Equipment on-site and/or under their Control in conformity with their management plan (4.3.4), with best available techniques and practices which are protective of human health and the environment, whether or not such activities have been identified as significant Environmental and Stewardship Aspects, and according to the following requirements (details below):



The Organization shall:

a) Restrict or disallow mechanical Processing of these Hazardous Electronic Equipment (HEE) and Problematic Components and Materials (PCMs)

Ensure that the items listed in Table 2 are safely removed from Electronic Equipment, separated, and not mechanically Processed (e.g. shredded), unless the mechanical Processing is accomplished by an operation which uses best available technologies specifically designed to Process the specific material in a closed system with engineering controls that prevent releases to the environment and work area, with workers fully protected from exposure. In addition, the Organization should only disassemble components to a level at which they can safely manage the associated hazards.

Table 2: Items to be removed so they are not mechanically Processed, unless specifications in paragraph 4.4.6.4 a) are met
▶ Mercury-containing components including mercury lamps, LCD screens, switches, batteries & subcomponents
▶ Cathode ray tubes (CRTs) including Phosphors, and other leaded display glass, such as leaded plasma display glass
▶ Glycolant coolants (e.g. in old rear-projection CRT display devices)
▶ Lithium button, lithium ion, and lead acid batteries, and batteries that have a potential for explosion
▶ Toners, inks, and toner & ink cartridges (liquid, pasty & powder), and their uncleaned cartridges
▶ Magnetrons in microwave ovens and other equipment, if they contain beryllium oxide ceramic insulators
▶ Polychlorinated biphenyl (PCB)-containing components
▶ Printer and copier drums and other components containing selenium and/or arsenic
▶ Radioactive devices or materials, such as some smoke detectors and nuclear medicine devices
▶ Any additional materials deemed hazardous, explosive, corrosive, or otherwise problematic for mechanical Processing, by the Organization or applicable regulations

b) Establish Processing controls for Electronic Equipment

Only Process Electronic Equipment which the Organization has the technical capability and operational capacity to Process, and establish and maintain:

1. Controls for mechanical size reduction (such as shredding), if applicable, which include installation and maintenance of emergency shut-off switches, and/or for materials separation (manual or mechanical) which protect workers & the environment from hazards,
2. Effective air quality control systems and procedures, if necessary based on air monitoring results, to capture and contain dust, gases, and vapors to prevent hazards and releases, including during removal of used pollution control filters, and
3. Processing of all Electronic Equipment only in enclosed, weatherproof sheltering in a manner that protects materials from adverse atmospheric conditions and leaching,

c) Establish Processing controls for HEE and PCMs

Establish operational controls and procedures for Processing HEWs & PCMs as follows:

1. Process HEE only on impermeable flooring,
2. Capture and contain Phosphors in a manner that prevents dispersal and exposures,
3. Never intentionally open sealed devices containing polychlorinated biphenyls (PCBs),
4. Minimize dispersal of toners and inks and breakage of their cartridges or containers, until they reach the point of qualified remanufacture or Final Disposal,
5. Separate batteries which have the potential for unintentional discharges, in ways that will not allow such discharge during storage, transportation, and handling,
6. Never incinerate (including waste-to-energy) materials which contain mercury, Halogenated Materials, and/or beryllium (unless required by law), and
7. Identify, isolate, and properly contain potentially radioactive equipment or materials, e.g. in nuclear medicine electronic devices and/or smoke detectors,

d) Properly contain (package) HEE and PCMs

Safely consolidate and contain HEE and PCMs in a manner which prevents leaching, leakage, spills, dispersal, and releases of vapors, fumes, particulates, dust, liquids, and/or other forms of dangerous materials, including:

1. Safely separate and consolidate removed HEE and PCMs [4.4.6.4.a)], and place in containers that:
   - Protect human health and the environment during storing and shipping of each material,
   - Meet the packaging and shipping requirements of respective Downstream Processors,
2. Accurately and visibly label containers according to their contents and packaging type, and
3. Prevent container damage, collapse, and contamination,

e) Properly store HEE and PCMs

Ensure that HEE and PCMs are stored, onsite and offsite, in a manner which prevents fires and contamination of air, soil, groundwater, and storm water runoff, including storage in:

1. Weatherproof sheltering with impermeable flooring,
2. Designated and labeled storage areas (or containers),
   - In a manner which minimizes spills, breakage, and injuries,
   - According to regulatory storage limits, including maximum time limits and quantities allowed in storage,

f) Facilitate safe and secure transport and shipping

Establish procedures to ensure safe and legal transportation/shipping of Electronic Equipment, including HEEs and HEWs, under the Organization's Control in a manner that allows optimal conditions for reuse & Recycling, and minimizes risks to human health and the environment, including:

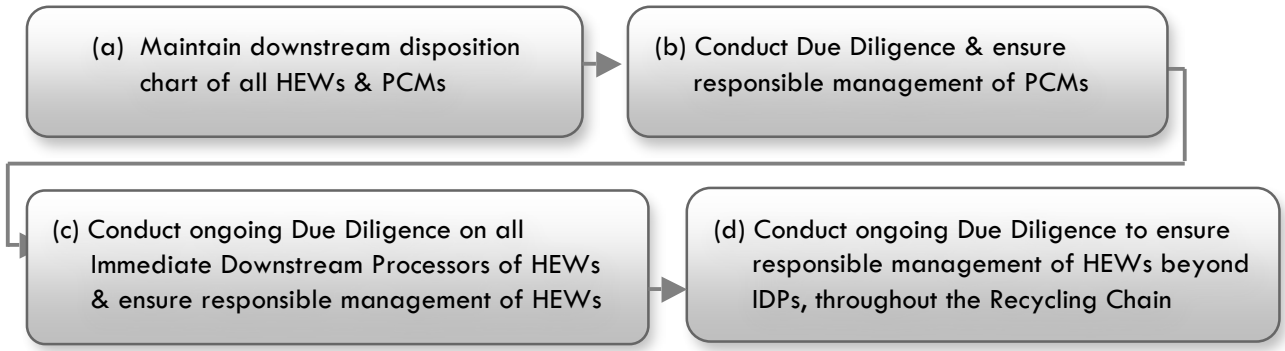
1. Accurate classification and labeling/placarding, record keeping, and appropriate packaging and security for transport, and
2. Use of transporters that have all legal authorizations, and adequate insurance or financial guaranty to cover costs in the event of an accident or injuries, and

g) Maintain facility and equipment security

Establish and maintain a system of controls that secures Electronic Equipment, inside and outside the facility, including storage, and clearly defines the beginning and end of the Organization's chain of custody of the materials, commensurate with the Organization's agreements and protection of affected stakeholders and the surrounding community.

4.4.6.5 Accountability for downstream recycling

An Organization shall establish, implement, document, and maintain an effective system of controls to track all HEWs and PCMs to Final Disposition, perform ongoing Due Diligence, and ensure these materials are managed in a manner that protects human health and the environment throughout each material's Recycling Chain, in facilities approved by the e-Stewards Organization in conformity with this Standard as summarized in the flow chart below:



Specifically, the Organization shall:

a) Establish an up-to-date downstream disposition chart of HEWs and PCMs

Create and maintain an up-to-date document which indicates the material flow and chain of all facilities and Brokers managing PCMs and HEWs which come through the Organization's facility and/or Control, including HEW residuals and Electronic Equipment going to End Refurbishers, throughout each material's Recycling Chain in accordance with Appendix A.4.4.6.5 a),

b) Conduct Due Diligence & ensure responsible management of PCMs throughout Recycling Chain

Prior to shipment, and Annually thereafter, verify and document that PCMs are only transferred to downstream destinations in accordance with 4.4.6.6 (Final Disposition) and 4.3.2.1 (Legal Exports),

c) Conduct ongoing Due Diligence on all Immediate Downstream Processors (IDPs) and ensure responsible management of HEWs by IDPs

Ensure HEWs are managed only in approved IDP facilities, with or without Intermediaries involved in transfers to these facilities, in accordance with requirements in Appendix A.4.4.6.5 c) and the following:

1. Evaluate, perform on-site audits of, and approve each IDP: Prior to initial shipment and at least Annually thereafter, evaluate and approve each IDP used for Recycling (including Repair/Refurbishment) and/or Final Disposal of the Organization's HEWs in conformity with requirements in this section 4.4.6.5 c), and perform on-site audits of each IDP using qualified auditors, unless IDP has a current and valid e-Stewards certification, in which case no on-site audit is required. If the IDP is an End Processor, the Organization or their qualified auditor shall perform on-site audits at least every 3 years,

2. Ensure IDP controls their downstream: Ensure the e-Stewards Organization's system of controls extends to the entire Recycling Chain for each HEW, including create and enforce written agreements[41] with each IDP to control and restrict destinations of HEWs to only approved facilities downstream of IDPs, throughout the Recycling Chain, unless the IDP for a particular HEW or PCM is a certified e-Stewards recycler,

3. Maintain ongoing records: Maintain objective evidence, including Shipping Records, of all the Organization's outgoing shipments and sales of HEWs and the corresponding acknowledgements of receiving and Processing these same shipments from each IDP[42], including certified e-Stewards recyclers, and

[41] If the IDP is an End Processor, such as a smelter or mercury retort operation, the Organization may alternatively obtain and maintain objective evidence of the End Processor's current and valid accredited certifications to ISO 14001 and OHSAS 18001, and shall advise the End Processor of the Organization's requirements in 4.4.6.6 (Final Disposition) and document End Processor's acknowledgement of these requirements.

[42] End Processors may provide records Annually.

4. Ensure IDPs have an environmental, health, and safety management system: Confirm that each Immediate Downstream Processor (except Final Disposal facilities) managing the Organization's HEWs fully implements, Annually reviews, and updates as needed a documented management system for: identifying and complying with legal requirements; identifying and effectively responding to environmental, health, and safety impacts and risks; and continually evaluating and improving that system and their operations accordingly.

NOTE: In the rare cases when Electronic Equipment from an Organization's customer[43] is sent directly to a non-certified e-Stewards Recycling facility, the Organization shall perform initial and ongoing Due Diligence on such facilities, in accordance with all requirements in this section (4.4.6.5), as well as including all such Electronic Equipment in the Organization's material balance accounting (4.5.1.3 a) - c).

d) Conduct ongoing Due Diligence to ensure responsible management of HEWs beyond IDPs, throughout the Recycling Chain, including when other certified e-Stewards are involved

At least Annually, and whenever changes in vendors and Brokers are made, evaluate and approve Downstream Processors and Final Disposal facilities beyond the IDPs, throughout the Recycling Chain, for each of the Organization's HEWs and their HEW residuals, and conduct ongoing Due Diligence, in accordance with requirements in Appendix A.4.4.6.5 d), including:

1. Verify business relationships downstream: Confirm with objective evidence[44] ongoing business relationships between each Downstream Processor and their downstream facilities throughout the Recycling Chain, including verification that written agreements or alternative control systems are in place and enforced between each facility throughout the Recycling Chain to restrict HEWs and their HEW residuals in conformity with the Organization's e-Stewards obligations found in this section 4.4.6.5, in 4.4.6.6 (Final Disposition), and in 4.4.6.7 (Export),

2. Confirm ongoing materials flow and records: Create, maintain, and implement a written procedure for reviewing and documenting an Annual random sampling of HEW shipments between each vendor in the Recycling Chain of HEWs, and

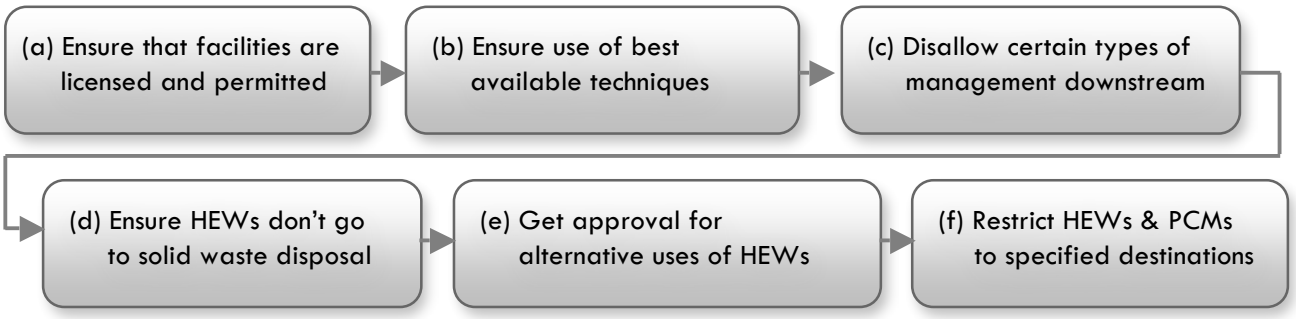
3. Ensure Downstream Processors have an environmental, health, and safety management (EHSMS) system: Confirm that each Downstream Processor managing the Organization's HEWs fully implements, Annually reviews, and updates as needed a documented management system for: identifying and complying with legal requirements; identifying and effectively responding to environmental, health, and safety impacts and risks; and continually evaluating and improving that system and their operations accordingly.

4.4.6.6 Restrictions on Materials Recovery and Final Disposition operations

An Organization shall ensure that Hazardous e-Waste (HEWs) and Problematic Components and Materials (PCMs) destined for Materials Recovery and/or Final Disposition are treated, Processed, and managed only in types of facilities or applications, throughout the Recycling Chain, as allowed by law and as listed below, including Table 3, with or without Intermediaries involved. Requirements are summarized in the flowchart, with details below:

[43] This assumes that the e-Stewards Organization is either representing services as e-Stewards services and/or benefitting in some way.

[44] e.g. via buy/sell agreements, scope of work agreements, or memorandums of understanding (MOUs)



Specifically, the Organization shall:

a) Ensure that such facilities are licensed and permitted, as required by applicable jurisdictions, to receive and Process or utilize the specific materials received,

b) Ensure that such facilities use best available techniques and processes/applications designed to safely recover and reuse maximum materials (except as limited in 3 below) and responsibly dispose of non-recyclable fractions, including:

   1. Prevent contamination of air, land, and water, including emissions and releases of hazardous chemicals, elements, and compounds, in any form,

   2. Manage residuals, by-products, and breakdown products of HEWs as hazardous waste, unless the facility regularly demonstrates that a specific type of residual:
      - Falls below the thresholds found in the definition of Hazardous e-Waste, e.g. by using a toxicity characteristic leaching procedure, and
      - Is not considered a hazardous waste by applicable regulation, and

   3. Permanently retire[45] asbestos, polychlorinated biphenyls, and radioactive materials in hazardous waste facilities licensed and permitted to manage the specific material for long term storage or destruction,

c) Ensure that, unless otherwise required by law, no downstream operations receive the Organization's HEWs or PCMs, directly or indirectly, if they:
   - Melt or burn Electronic Equipment in open fires,
   - Incinerate (including waste-to-energy) materials which contain mercury, Halogenated Materials, and/or beryllium,
   - Smelt Electronic Equipment without effective controls to capture emissions, including mercury, beryllium, and halogenated compounds such as dioxins, furans, and brominated flame retardant compounds, consistent with local and national regulations, or
   - Allow HEWs or PCMs to be used in hydraulic fracturing or injection wells,

d) Ensure that no HEWs are disposed of in solid waste disposal operations, other than exceptions found in Rows 6 & 8 in Table 3 (treated leaded display glass & treated Processing residuals),

NOTE: Hazardous waste landfills may be used for a particular HEW, as a last resort, if a) – d) and all of the following conditions are met:
- There are no feasible Materials Recovery facilities in country or available via legal export to an OECD/EU country for environmentally sound management, as determined and documented by the Organization,
- There are hazardous waste laws in the country which allow hazardous waste land filling of the particular

[45] i.e. do not allow back into the marketplace for further use in products or processes

material, and

- The hazardous waste landfill has current permits to accept and dispose of the specific material in question, and is lined and leachate-controlled or encapsulated, and monitored long-term.

e) Ensure that Processes utilizing HEWs in new/alternative applications (uses) (i.e. other than Materials Recovery or Final Disposal) have been approved in writing by the e-Stewards program administrator[46], and

f) Restrict HEWs and PCMs to approved facilities according to the requirements in Table 3 below, unless otherwise required by law:

Table 3 Restrictions on Materials Recovery & Final Disposition Operations for HEWs and PCMs (in addition to restrictions above)

Type of HEW or PCM:	These HEWs or PCMs shall:
1. Arsenic-containing equipment or components if defined as HEE	▶ Not be openly burned or Processed in operations which release arsenic or its compounds to the biosphere; and ▶ Be sent to hazardous waste disposal or Processed by integrated smelters or other types of facilities capable of effectively recovering arsenic and arsenic compounds.
2. Batteries – Sorted alkaline & non-hazardous batteries[47]	▶ Be recycled in battery recycling facilities or steel mills that recover the metal value, even if disposal is allowed by law, or ▶ If no recycling markets or options are available, including legal exports, these batteries may be disposed of in legally permitted solid waste landfills.
3. Batteries – if defined as HEE	▶ Be recycled in a battery recycling facility which recovers the metal value from the batteries and properly handles hazardous materials, including potentially corrosive & explosive constituents, or ▶ If no recycling markets or options are available, including legal exports, batteries may be disposed of in legally permitted hazardous waste disposal facilities.
4. Beryllium-containing components defined as HEE	▶ Never be Processed in incinerators of any kind, ▶ Be sent to integrated smelters which agree to accept beryllium-containing components and are equipped to responsibly Process and capture beryllium, or ▶ Be sent to hazardous waste landfills licensed & permitted to manage beryllium

[46] Decisions will be made on the basis of research, expert advice, and scientific evidence of risks involved. If new technologies are proprietary, the program administrator will sign a non-disclosure agreement in order to review pertinent information. If new technologies are not proprietary, the e-Stewards Technical Committee may provide recommendations to program administrator regarding the acceptability of such technologies. A dispute resolution process will be available.

[47] May not contain lead, mercury, cadmium, lithium, flammable organic solvents, or unknown contents

Type of HEW or PCM:	These HEWs or PCMs shall:

5. Cathode ray tubes (CRTs) (with or without vacuum) & CRT glass that is uncleaned	▶ Never be placed in solid waste disposal operations, and
	▶ Be directed to:
	  ▶ A CRT glass processor, in conformity with 4.4.6.7 (Export), for preparation for use in the manufacture of new products,
	  ▶ A lead smelter, integrated copper smelter, or other technology capable of recovering lead and cadmium,
	  ▶ As a last resort, a lined, leachate-controlled hazardous waste landfill, unless forbidden by law.

6. Cleaned display glass containing lead, including:
▶ CRT glass, and
▶ Some flat panel display glass, e.g. leaded plasma glass
	▶ Be thoroughly cleaned of Phosphors, coatings, frit, fines, and particulates,
	▶ Be Processed in any of the following types of facilities:
	  ▶ Facilities which completely utilize the leaded glass in manufacturing new products that will not leach metals during their useful life,
	  ▶ Lead smelter, integrated copper smelter, or other thermal technology capable of recovering lead, or
	  ▶ Hazardous waste landfill, and
	▶ Never be placed in solid waste disposal operations, except, as last resort, in a lined, leachate-controlled & monitored solid waste disposal facility if the cleaned glass has first been stabilized with a pre-treatment method in accordance with applicable laws and, as a result, passes the TCLP and thresholds found in definition of HEW (unless prohibited by law or facility).

7. CRT glass that is non-leaded & thoroughly cleaned[48] of Phosphors, coatings, frits, and fines	▶ Be allowed for use in alternative applications, if they will not leach metals during their useful life, and ▶ As a last resort, may be disposed of in solid or hazardous waste disposal facilities, if allowed by law.

8. CRT Processing residues and CRT residues, including :
▶ CRT Phosphors,
▶ Coatings,
▶ Frits,
▶ Fines, and
▶ Waste streams contaminated with them
	▶ Never be Processed in incinerators of any kind,
	▶ Always be considered HEWs for the purpose of export,
	▶ Be Processed in one or more of the following facilities that have been notified and have consented in writing in advance to accept such materials:
	  ▶ Facility that reclaims rare earth & critical metals (e.g. in Phosphors),
	  ▶ Primary or secondary smelter that recovers lead & cadmium,
	  ▶ Lined, leachate-controlled, and monitored solid waste landfill, only if residues have first been stabilized with pre-treatment in accordance with applicable laws and pass TCLP & thresholds found in definition of HEW,
	  ▶ Lined, leachate-controlled and monitored hazardous waste landfill, and
	▶ If Phosphors cannot be recycled, and if allowed by law, store them in safe, monitored, retrievable hazardous waste storage for future Recycling, e.g. of critical metals.

[48] As determined by a TCLP or equivalent method via a regular sampling

Type of HEW or PCM:	These HEWs or PCMs shall:
9. Glycol-based coolants	▶ Be recycled (preferably) in a facility which decontaminates and restores coolant properties, or ▶ Be finally disposed of with treatment as a specially controlled liquid waste.
10. Inks and toners, including liquid, pasty, and powder forms	▶ Managed in facilities that prevent explosions and respiratory hazards according to the following hierarchy, in order of preference: 1. Reuse cartridges by refurbishing or remanufacturing them, 2. Recycle emptied and cleaned cartridges in plastics recovery facilities, and recover carbon black for use in manufacturing, if possible, 3. Remove inks & toners, dispose of color inks & toners in hazardous waste landfills, and black inks & toners in solid or hazardous waste landfills, 4. Dispose of entire units including inks and toners in hazardous waste landfills or incinerators, and/or 5. Dispose of ink and toner cartridges and containers in a solid waste landfill only if the landfill has been notified and consented in writing in advance to accept ink and toner cartridges and containers as profiled & documented.
11. Mercury and mercury-containing devices	▶ Never be Processed in incinerators of any kind, ▶ Not be 'recovered' in metals smelters, including smelters that recover mercury in the form of calomel and/or utilize mercury capture systems not designed for full mercury recovery from waste materials or secondary sources, and ▶ Preferably be permanently retired (before or after mercury retort operations) in a monitored, secure, and retrievable long term mercury storage facility and not recovered for reuse, or ▶ Be Processed at mercury retort facilities until or unless such long term mercury storage is available, in a facility that achieves a minimum of 99.99% mercury capture and recovery.
12. Plastics & resins with Halogenated Materials, including: ▶ Plastics that are baled, shredded, or whole, with or without metal contamination, ▶ Cleaned ink and toner cartridges with such plastics	▶ Not be melted or burned in open fires, ▶ Preferably be recycled in plastics recovery facilities which separate and recover reusable plastics as long as, prior to shipment, the Organization obtains current valid operating and environmental licenses & permits to Process the specific plastics/resins. The unrecyclable plastics, waste materials, and residues shall be Processed via one of the plastic disposal Processes set forth immediately below, ▶ Be Processed in a smelter which continuously monitors, captures, and restricts emissions, including dioxins, from flue gas stacks, ▶ As a last resort, be disposed of in a leachate-controlled solid or hazardous waste landfill.

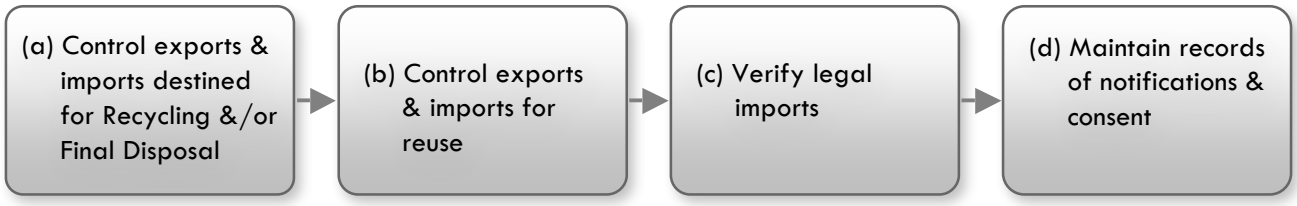
Type of HEW or PCM:	These HEWs or PCMs shall:
13. Polychlorinated biphenyl-containing components with PCB concentrations above 50 ppm or quantity unknown	▶ Never be opened up, recycled, or shredded, except by PCB processors that meet qualifications defined in remaining requirements in this section, and ▶ Only be dismantled & Processed by a processor that is trained and compliant with both: ▶ Basel Convention & Stockholm Convention guidelines and obligations, and ▶ Additional applicable national laws.
14. Printed circuit boards, or components or materials (e.g. shredded fractions) which contain lead solders, Halogenated Materials, or fail threshold levels in definition of HEE	▶ Be pre-processed (e.g. shred the boards and refine/alloy metals in preparation for End Processors), if needed, in facilities which monitor and prevent releases of hazards, such as toxic dusts and stack emissions; and ▶ Be Processed by End Processors that are either: ▶ Pyrometallurgical facilities, such as integrated copper smelters, that monitor and restrict fumes and emissions, including continuous dioxin monitoring from flue gas stacks, and/or ▶ Hydrometallurgical facilities that control and manage fumes, and all hazardous residues to prevent releases to the environment and/or exposures.
15. Radioactive wastes	▶ Be transferred to a facility that meets international standards[49] for storage or disposal of radioactive wastes.
16. Residuals from Processing, pollution controls, and housekeeping, such as bag-house dusts, filter residues, slags, and sweeps	▶ Shall be managed as hazardous waste unless the Organization can regularly demonstrate that a specific type of residual: ▶ Falls below the thresholds found in definition of HEE, and ▶ Is not considered a hazardous waste by regulation, and/or ▶ If allowed by law: ▶ Residuals which contain identifiable fractions of metals or other materials, e.g. sweeps from shredding or manual dismantling areas, may be reprocessed within the Organization's Processing systems, and/or ▶ Residuals which contain high enough levels of precious metals or other materials to make them recyclable in either pyro- or hydrometallurgical facilities may be Processed according to requirements for printed circuit boards above.
17. Selenium-containing components[50]	▶ Shall be transferred to a facility licensed and permitted to Recycle or dispose of selenium.

4.4.6.7 Export and import controls

The Organization shall establish, implement, document, and regularly update an effective system of controls in order to restrict exports and imports of Hazardous e-Waste (HEWs) and Problematic Components and Materials (PCMs) that enter their facility(s) or come under their Control and throughout the Recycling Chain, in accordance with 4.3.2.1 (Legal) and the following requirements:

[49] Notably the instruments of the International Atomic Energy Agency (IAEA), including the Convention on Nuclear Safety, the Codes of Conduct, and the International Safety Standards.

[50] e.g. xerographic photocopier drums, older printer drums or analog copiers, some solar panels & other photovoltaic cells



Specifically, the Organization shall:

a) Control exports and imports of PCMs and HEWs destined for Recycling and/or Final Disposal

The Organization shall not allow PCMs and/or HEWs to be exported or imported, directly or indirectly, except as stipulated in 4.3.2.1. However, the following materials may be traded if considered legal by all the countries concerned (export, transit, & import) and meet requirements below :

1. Plastics with Halogenated Materials may be exported to any country, but prior to export, the Organization shall obtain and maintain copies of current import permits from all facilities in other countries which receive the Organization's plastics with Halogenated Materials, as well as objective evidence of conformity to requirements in 4.4.6.6 h) Row 12,
2. Prepared CRT cullet, exported for use as a feedstock to manufacture new products that are deemed non-waste by the Competent Authority of the importing country shall not be considered an HEW, and will therefore not be subject to the import and export restrictions found in 4.3.2.1. This exception shall be allowed only if all of the following occur prior to exportation:
   - The cullet is thoroughly cleaned of Phosphors, coatings, and other dispersible particulates, using best available technologies,
   - It is determined, via objective evidence, that the cullet will be used as a direct feedstock in manufacturing new products without further Processing or preparation, other than quality control screening,
   - Any conditions placed on such legal trade by the Competent Authorities in the written determinations of any country concerned (export, transit, and import) are implemented,

b) Control exports and imports of Electronic Equipment for reuse

When exporting or importing, directly or indirectly, any Electronic Equipment (including components) for reuse from or to their facility and/or Control, the Organization shall:

1. Assume all Electronic Equipment which is being exported or imported for Repair/Refurbishment is Hazardous Electronic Equipment (HEE), unless there is objective evidence accompanying each shipment that it contains no HEEs and PCMs,
2. Ensure that each shipment of Electronic Equipment exported or imported for reuse only takes place in conformity with 4.3.2.1 (Legal Exports)[51] and 4.4.6.2 (Reuse)[52], and
3. In addition to labeling requirements in 4.4.6.2 c), ensure that each shipment exported for reuse is accompanied by a completed and signed declaration/document found in Appendix A.4.4.6.7 b), attached in a manner that is easily accessible to officials and customers, without the need for unpacking, and

[51] e.g., the Organization shall not export equipment or components for repair from OECD/EU countries or Liechtenstein to non-OECD/EU countries.

[52] Conformity with these sections does not require that cosmetic alterations or software loading be completed prior to export/import

c) Verify legal imports of e-Waste

For incoming e-Waste that is not generated in-country, assure that Electronic Equipment Processed by the Organization has not been imported, directly or indirectly, into the Organization's country in violation of the Basel Convention and/or the Basel Ban Amendment, regardless of whether or not either instrument is in legal force nationally or internationally, and

d) Maintain records of Competent Authority notifications and consents for all legal shipments of HEWs.

4.4.7 *Emergency preparedness and response*

An e-Stewards *Organization shall provide for emergency preparedness within its environmental management system and specify how it will respond to possible emergencies,* injuries, *and accidents,* and data security breaches. *The Organization shall specifically* take measures to prevent fires and explosions in and around facilities, by recognizing, evaluating, and controlling risks for both. *Periodic drills to test emergency preparedness shall be conducted, where safe and practical.*

Organizational response to actual emergencies shall prevent or remediate adverse environmental, occupational health and safety, and data security *impacts.*

An e-Stewards *Organization shall regularly reassess its procedures for emergency preparedness and response, and improve them as needed.*

4.4.8 Insurance

An Organization shall obtain and maintain liability insurance[53] adequate to cover the potential risks and liabilities, per occurrence and in the aggregate, as follows:

a) Levels of insurance shall be commensurate with the nature and size of the Organization's operations[54],

b) The insurance shall cover liability for data privacy breaches, contractual liability, property damage, environmental pollution, and occupational health and safety impacts (e.g. hazardous exposures and releases, bodily injury, and accidents) and other emergencies, and

c) The Organization shall retain the appropriate insurance to underwrite indemnification to customers, if indemnification is offered and allowed by law.

The Organization shall obtain professional advice and bids of at least two insurance actuaries regarding appropriate insurance for their site(s). The record of this professional advice shall be maintained as part of the e-Stewards records system and the insurance coverage ultimately chosen should fall within the range of the bids.

4.4.9 Site closure plan and financial surety

The Organization shall create and maintain a site closure plan which stipulates how the Organization's closed site(s) will be tested and remediated (if necessary), and how all remaining Electronic Equipment will be properly managed in accordance with this Standard and regulations[55] in the event of sale, closure, abandonment, bankruptcy or any form of dissolution of the

[53] Or its equivalent, in countries which do not allow insurance.

[54] Take into consideration whether or not operations break CRTs, manually dismantle, bale, shred, incur transportation liability, and/or incur non-owned disposal facility liability.

[55] e.g. based upon the regulatory authority's operating permit or site closure parameters for the facility

company/Organization. The Organization shall also provide a financial instrument(s) put into custody of a third party[56] to cover costs for the execution and completion of site clean-up and closure, even in the case of abandonment, according to this plan, including Electronic Equipment and residuals in storage. The plan shall include a closure schedule, as well as:

a) A description of the facility and inventory, including:

3. Site description,

4. Current plot (site) plan, and

5. Estimates of the maximum amount, by weight or count, of whole electronic devices, Processed and sorted components and materials, and hazardous materials inventory that will have been held on site at any one time (based upon the active life of the facility), including an estimate of wastes that will be generated from closure activities,

b) Closure activities

1. Removal, transportation, Materials Recovery, and Final Disposition of all Electronic Equipment, waste, and HEWs & PCMs, including those in off-site storage areas,

2. Industrial Hygiene monitoring during closure activities, if PHPTs were used at any time,

3. Cleaning of the facility(s), and outside and off-site storage areas,

4. Remediation & decontamination procedures & activities, if PHPTs are used at any time, and

5. Closure cost estimates, including a breakdown for:

- Final Disposition of each type of Electronic Equipment,
- Clean-up, including cleaning, remediation, and decontamination activities,
- Industrial Hygiene monitoring, and
- Closure certification, if required by law, and

c) A requirement for qualified third party testing, analysis, and remediation upon closure of all facilities and sites which have ever:

- Utilized Potentially Hazardous Processing Technologies, and/or
- Stored or managed Hazardous Electronic Equipment outside of sheltered and impermeably floored buildings.

This requirement includes:

1. Conduct indoor wipe (dust) sampling of areas and items which may have been contaminated by heavy metals, including lead, cadmium, and mercury, using sampling and analysis methodologies that provide results representative of facility and site contamination,

2. If any thermal operations were utilized in the facility (except hand-held soldering), conduct dust sampling on polycyclic aromatic hydrocarbons that likely result from thermally treated Electronic Equipment, and

3. Remediate any contamination above regulatory limits for industrial site remediation.

[56] e.g. in escrow, or insurance or bonds held by a third party, or in a financial tool specified by law.

4.5 Checking

4.5.1 Monitoring and measurement

An e-Stewards *Organization shall create a procedure(s) to monitor, measure, and document appropriate operational characteristics related to its significant environmental* and Stewardship *aspects and impacts on the environment,* data security, and occupational health and safety. *Properly calibrated or otherwise verified equipment shall be used and maintained for required monitoring and measurement.*

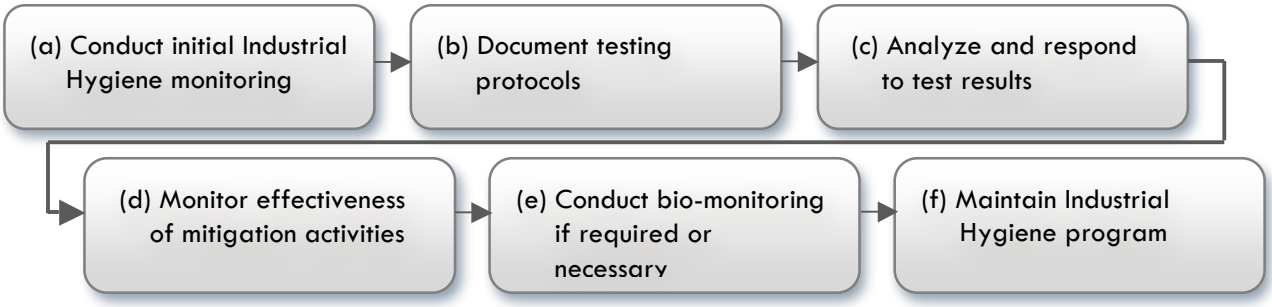
The Organization shall ensure that Industrial Hygiene samples are analyzed by an ISO 17025 certified laboratory or by a nationally accredited laboratory that is capable of testing for the necessary constituents.

4.5.1.1 Environmental, health, and safety incident monitoring and reporting

The Organization shall establish and maintain a process for internal reporting of events including a summary log and up-to-date and accurate records of all environmental releases, health and safety accidents, incidents, injuries, exposures, and near misses.

4.5.1.2 Additional Industrial Hygiene monitoring for Organizations using Potentially Hazardous Processing Technologies (PHPTs)

Organizations using one or more PHPTs shall establish, implement, and maintain a documented Industrial Hygiene monitoring program to reduce or eliminate workplace hazards and exposures to hazardous materials, protect worker health and safety rights, maximize injury and illness protection, and ensure that operational controls (4.4.6.1) are adequate, including:



The requirements for each of these steps are as follows:

a) Conduct initial Industrial Hygiene monitoring

Conduct and document Industrial Hygiene monitoring twice in the first year, at least four months apart, in all areas where Potentially Hazardous Processing Technologies are located and in use, under maximum operating conditions, and in any areas where hazards could be present or likely to develop or migrate. The Organization shall mitigate problems according to requirements in 4.4.6.1. This monitoring shall be conducted by a Certified Industrial Hygienist or Equivalent, and shall include:

1. Noise monitoring in areas where workers may be exposed to excessive noise, including operation of balers and shredders, using technology (such as noise dosimetry equipment) that incorporates impact, continuous and intermittent noise sources so the noise risk assessment (4.3.1) accurately relates to the workers' ongoing workday exposures,
2. Airborne hazards, including worker breathing zones, for both the operators of PHPTs and those working where exposure may occur, to ensure lack of migration of airborne hazards.

The Organization shall monitor specific airborne hazards in accordance with requirements in Appendix A.4.5.1.2 a) 2,

NOTE: In response to information emerging at the time of publishing this Standard regarding the inadequacy of air monitoring alone to determine actual exposures, this Standard will likely add requirements (via a sanctioned interpretation, for additional testing (e.g., for lead, for bio-monitoring of some workers, and/or surface sampling) and reporting test results. The purpose of these changes is to collect data, better understand risks associated with specific types of operations in the electronics recycling/refurbishment industry, and further revise this Standard based on analysis of data. Organizations are urged to immediately apply best management practices. See Guidance Document for best management practices regarding additional initial and ongoing testing, until it becomes a requirement in this Standard.

b) Document testing/monitoring protocols

Maintain thorough written documentation of both initial and ongoing [4.5.1.2.a) and f)] monitoring protocols and activities,

c) Analyze and respond to test results

Ensure a Certified Industrial Hygienist or Equivalent and/or a physician (knowledgeable in occupational medicine and/or medical toxicology) analyzes monitoring results (4.5.1, 4.5.1.1, and 4.5.1.2), including calculating time weighted averages, by comparing the test results to the most stringent (protective) regulatory exposure limits within the Organization's jurisdiction,

d) Monitor and ensure effectiveness of mitigation activities and controls, and impacts of significant changes

Utilizing these test results, the comparison with regulatory limits, and requirements in 4.4.6.1a), establish or take action to create or improve operational controls (4.4.6.1), take corrective and preventive actions (4.5.3), and update and/or improve the risk assessment [4.3.1 c)], responding quickly to test results of concern (i.e. mitigating). Determine that mitigation activities and controls are effective in reducing or eliminating exposures and preventing adverse health effects, and that impacts of significant changes involving PHPTs (e.g. installation of a new shredder) meet requirements in this Standard, including retest mitigated activities, areas of concern, and significant changes as soon as possible, but no longer than 6 months following mitigation efforts and/or significant PHPT changes,

e) Determine medical surveillance needs and conduct biological-monitoring if required

The Organization shall have a designated occupational health provider (i.e. an occupational health physician or occupational health nurse, or occupational physicians' clinic) who is available for medical surveillance (biological monitoring) of workers if the Organization is using one or more PHPTs, for workers that consent. The Organization shall:

1. Determine that biological-monitoring is needed if:
    - Recommended by the occupational health provider who shall be provided with the results of the risk assessment (4.3.1.c),

- Representative[57] Industrial Hygiene exposure data indicates regulatory occupational exposure limits have been exceeded or workers are engaged in high exposure tasks,
- Recommended by the Certified Industrial Hygienist or Equivalent, or
- Requested by the occupational and environmental health and safety team (4.4.3.1.a) 4) or any worker concerned about their potential exposures, and if agreed by the occupational health provider,

2. Develop, document, and implement a medical surveillance program, if needed, as determined in 1 above, in consultation with the Certified Industrial Hygienist or Equivalent. The occupational physician shall decide upon the medical issues, but these decisions may be carried out by an occupational health nurse or physician's assistant. This medical surveillance program shall:

   - Be conducted for all workers whose representative Industrial Hygiene exposure data indicates the occupational exposure limits have been exceeded,
   - Be based on generally accepted methods and regulatory requirements,
   - Inform the physician with written documentation of pertinent activities performed, work practices, materials handled, exposure controls, personal protective equipment used, air monitoring results, and any prior worker test results,
   - Specify frequency of biological testing, medical exams, and conditions where workers are removed or returned to work,
   - Include worker baseline examinations and specify when follow up medical evaluations are required,
   - Be provided without cost to affected or potentially affected workers, and in cooperation with affected workers, and
   - Entitle workers to a second medical opinion for occupational exposures, injuries or illness, within reasonable costs,

3. Ensure laboratory analyses are performed by an ISO 17025 certified laboratory or a nationally accredited laboratory, and

4. Require in writing that the occupational health provider maintains the confidentiality of all workers' non-work-related medical issues by only revealing to the Organization information specifically related to the workers' workplace exposures/hazards, and

f) Update & maintain the ongoing occupational health & safety and Industrial Hygiene program

The Organization shall update and maintain the ongoing occupational health & safety and Industrial Hygiene monitoring program with the Certified Industrial Hygienist or Equivalent to:

1. Identify activities and locations to be retested by reviewing the:

   - Significant Environmental and Stewardship Aspects identified in the risk assessment [4.3.1 c) & d)],

[57] For example, take at least 3 personal samples for each unique task, under full capacity scenarios, and make decisions based on the 95th percentile results. The accuracy of the monitoring and analysis used should have accuracy (to a confidence level of 95%) of not less than plus or minus 20 percent for airborne concentrations of the substance equal to or greater than the occupational exposure limit.

- Results of the initial (4.5.1.2.a) and ongoing (4.5.1.2.d) Industrial Hygiene monitoring,
- Proposed and actual significant changes, and
- Effectiveness of operational controls (4.4.6.1), and

2. Create and implement a schedule for ongoing monitoring, under worst-case scenario operations, of significant Environmental and Stewardship Aspects, based on the results of 4.5.1.2 d) above. The schedule shall also include:

   - Monitoring of other areas or contaminants recommended by the Certified Industrial Hygienist or Equivalent and/or the physician and if needed, other health and safety experts,
   - Noise monitoring as required in 4.5.1.2.a) 1, and
   - Monitoring of airborne hazards, based on testing frequencies required in Appendix A.4.5.1.2.e) 2.

4.5.1.3 Track Electronic Equipment

An Organization shall implement and maintain a documented system for tracking all Electronic Equipment entering and exiting their facility(s) and under their Control. The Organization shall:

a) Track all Electronic Equipment

Establish, document, and implement an effective system for tracking and documenting all Electronic Equipment coming into and going out of the Organization's facility and/or Control, and in accordance with requirements in 4.4.6.5 (Downstream Accountability), including materials managed and destined for reuse, Recycling, and disposal, and those managed by their Ancillary Sites. Even in jurisdictions where the e-Stewards Organization has no control over where or how some of their e-Waste is processed, due to laws, these volumes shall still be accounted for in their tracking and materials balance accounting,

b) Implement material balance accounting

Perform and calculate a documented material balance accounting at least every six months for all Electronic Equipment coming into and going out of the Organization's facility and Control, as well as in inventory[58], reconciling incoming quantities with outgoing quantities, and

c) Link material balance accounting with Shipping Records to downstream vendors

For all Electronic Equipment destined for reuse, HEWs, and PCMs, ensure that the tracking system [a) above] links outgoing quantities documented in each material balance accounting period [b) above] with corresponding subsequent outgoing Shipping Records [4.4.6.5 c) 3] for those same quantities of respective materials, including their corresponding acknowledgments of receipt and Processing (or equivalent) which confirm they have been managed by approved Immediate Downstream Processor(s), with or without Intermediaries involved.

4.5.1.4 Report to e-Stewards database

Prior to initial certification, and by January 31st of every subsequent year, the Organization shall provide the following data, in English language, for each calendar year[59] to the confidential[60] e-

[58] i.e. equipment and components currently being managed and/or stored in-house or under the Organization's Control

[59] January 1st through December 31st. For the initial certification only, the Organization may provide less than a full year of data. In this case, data must be provided from the period of time between when the Organization contracted for initial certification and when they accomplished their Stage One audit, and must include at least three consecutive months of data.

Stewards database by uploading it to https://apps.e-stewards.org/database regarding all Electronic Equipment entering their facility(s) and/or under their Control (including associated Ancillary Sites):

a) Address (including country) for primary location(s), and a description of the site,

b) The number of individuals who worked for more than one month during the twelve month period, including:

   1. Full time (equivalent[61]) employees,
   2. Full time (equivalent) contract workers, and
   3. Volunteers,

c) Description of all Processes taking place at each site, such as:

   1. De-manufacturing of e-Waste for Materials Recovery and/or Final Disposal, in one of more of the following categories:
      - Manual disassembly,
      - Shredding or other mechanical size reduction and separation, and/or
      - Other (define),
   2. Asset recovery, Repair/Refurbishment for reuse,
   3. Metals refining,
   4. Plastics recovery, and/or
   5. Other (define), and

d) Total weight (or unit count) of Electronic Equipment, components, and materials Processed, in inventory, and under Organizational Control.

4.5.2 *Evaluation of compliance*

4.5.2.1 Evaluation of legal requirements

The e-Stewards Organization shall implement and maintain a process for regularly monitoring its compliance with applicable legal requirements, and record its results.

4.5.2.2 Evaluation of other requirements

The e-Stewards Organization shall evaluate its compliance or conformity with other requirements which may apply to the Organization.

The Organization shall document and maintain the results of the regular evaluations.

[60] The e-Stewards program will only publicly report this data in the aggregate. Information from individual Organizations will not be shared in a manner that identifies the Organization, unless the e-Stewards Organization agrees in writing to allow such identification. Except for the names of data entry personnel, this data shall exclude individual names, identifiers, or personal information that could violate laws, or the privacy of people and Organizations.

[61] Combine part time hours worked by all part time workers and calculate how many full time jobs are equivalent.

4.5.3 Nonconformity, corrective action and preventive action

An e-Stewards Organization shall implement and maintain a process for addressing and documenting nonconformities discovered and for correcting nonconformities with closed loop corrective action, including determination of cause.

The Organization shall also implement, document, and maintain a system for taking preventive actions for the purpose of preventing nonconformities from occurring, and reviewing the overall effectiveness of both preventative and corrective actions implemented.

4.5.4 Control of records

An e-Stewards Organization shall maintain and control legible and verifiable records which demonstrate conformity to the requirements of the EMS, including requirements for documentation as found in the complete e-Stewards Standard. *Control of records shall include processes for protected storage and retrieval, retention, naming, and disposal of records.*

4.5.4.1 Records retention

The Organization shall retain all records required by this Standard for a minimum of 5 years with the exception of workplace and worker exposure records, which shall be retained for the length of each worker's employment plus 30 years.

4.5.5 Internal audit

An e-Stewards Organization shall conduct internal audits of its management system at regularly scheduled times, at least Annually, *to check for initial implementation and continuing conformity with system requirements. Results shall be reported to top management.*

The audit program shall be conducted taking into account the relative importance of each element of the EMS and previous audit and performance results, as well as the proper qualification and impartiality of auditors involved.

4.6 Management review

The highest level of management shall review the performance of the environmental management system at regularly scheduled times, at least Annually, *and take appropriate action to correct and improve the system based upon results.*

Consideration shall be given to internal system audit results, input (including complaints) from customers or other outside parties, the degree to which system objectives (including legal requirements) are met, the status of nonconformities and corrective actions, opportunities for improvement and preventive action, and action items from previous reviews.

Records of reviews, suggestions for improving the system, and actions to be taken shall be maintained.

APPENDIX A: REQUIREMENTS FOR ALL e-STEWARDS ORGANIZATIONS

A.4.4.6.5. Downstream Accountability

a) Establish and maintain an up-to-date downstream disposition chart of HEWs and PCMs

The downstream disposition chart shall provide the following up-to-date information for the entire Recycling Chain for each PCM and HEW (including HEW residuals, e.g. hazardous slag and filter residues, CRT Processing residuals), documenting the chain of all Downstream Processors, End Refurbishers, Brokers, End Processors, and Final Disposal facilities used throughout the Recycling Chain for each material, including:

1. Current company/entity name, contact information, address of physical location of facility and office (including country), and type of operation, and
2. Identification of downstream certified e-Stewards Organizations,

b) (No additional requirements)

c) Conduct ongoing Due Diligence on all Immediate Downstream Processors (IDPs), and ensure and track responsible management by IDPs managing each HEW

The Organization's system of controls for all HEWs and their HEW residuals shall begin with their own material balance accounting and corresponding outgoing shipments (see 4.5.1.3 c) to approved IDP facilities, including End Refurbishers, and shall include the following:

1. Evaluate, perform on-site audits, and approve each IDP, including:
   i. At least Annually, and whenever changes in vendors and/or Brokers are made, determine that each IDP has the in-house technical capability, operational capacity (including controls), and willingness to further Process and/or dispose of HEWs in a manner that effectively meets the Organization's obligations for HEWs and in accordance with the IDP's legal requirements, as well as 4.2 b), 4.3.2.1 (Legal Exports and Imports), the Organization's plan for materials (4.3.4), 4.4.6.2 (Reuse) and 4.4.6.3 (Data Security) if applicable, 4.4.6.4 (Management of EE), 4.4.6.5 (Downstream Accountability), 4.4.6.6 (Final Disposition), and 4.4.6.7 (Export & Import Controls),
   ii. Ensure that each IDP maintains and provides to the Organization ongoing records of the IDP receiving and Processing the Organization's HEWs, as well as random sampling of downstream Shipping Records, including acknowledgements of receipt and Processing (see A.4.4.6.5 d) 2),
   iii. Create and enforce written agreements with each IDP, and renew Annually, to restrict, and control the Organization's HEWs according to requirements in section 4.4.6.5. This agreement shall include a requirement for each IDP to immediately (within 5 business days) notify the Organization if any of the IDP's Downstream Processors or Brokers change,
   iv. Annually perform Due Diligence, and determine, via objective evidence, that all IDPs have valid and current business licenses, process and facility permits, control permits, and import permits, as applicable, to properly manage the Organization's materials, and that they have adequate insurance and site closure plans, appropriate to the scope and scale of their operations and potential remediation costs. Verify the

accuracy and adequacy of information obtained, and determine if each IDP has had regulatory violations, fines, and/or related enforcement actions in the past 5 years,

v. Verify with documented evidence that each IDP either:
   - Has a current and accredited certified environmental health and safety management system (EHSMS), or
   - Fully implements, Annually reviews, and updates as needed a documented management system for: identifying and complying with legal requirements; identifying and effectively responding to environmental, health, and safety risks; and continually evaluating and improving that system and their operations accordingly,

   Ensure this management system effectively implements environmental, health & safety procedures, controls, and monitoring to prevent exposure and releases to toxics such as lead, mercury, and cadmium,

vi. If the IDP is an End Refurbisher, confirm on an ongoing basis and at least Annually that all of the outsourced reuse tasks conducted by the End Refurbisher(s) are effectively implemented and completed in-house, in conformity with 4.4.6.2 (Reuse) & 4.4.6.3 (Data Security), and

vii. Determine that transport companies used by IDPs have adequate financial guaranty to cover costs in the event of an accident or error,

2. Ensure that each IDP for each HEW has an effective system of controls to restrict and document downstream destinations of HEWs to approved facilities only, throughout the Recycling Chain, including when Brokers and other Intermediaries are used, in conformity with A.4.4.6.5 d) below. The Organization's system of controls and ongoing Due Diligence shall include:

   i. At least every 2 years, and whenever changes in vendors and/or Brokers are made, visually inspect and create a detailed written report confirming work agreements between each IDP and their next tier downstream vendors that stipulate how the entities downstream of the IDP meet the Organization's obligations in 4.4.6.6 (Final Disposition) and 4.4.6.7 (Export), including when Brokers are involved,

   ii. Annually obtain from each IDP the company name, contact information, facility and office address (physical location, including country), and type of operation for each Downstream Processor, Broker, and Final Disposal facility for each HEW and HEW by-products, and

   iii. Ensure that when Intermediaries (such as Brokers) are used, they restrict the transfer of HEWs only to Downstream Processor(s) and/or Final Disposal facilities approved by the Organization, and

d) Conduct ongoing Due Diligence to ensure responsible management of HEWs beyond IDPs, throughout the Recycling Chain

At least Annually, and whenever changes in vendors and/or Brokers are made, evaluate and approve Downstream Processors & Final Disposal facilities beyond the IDPs, throughout the Recycling Chain, to ensure they operate in conformity with applicable legal requirements, 4.2.b) (Policy), 4.3.2.1 (Legal Exports), 4.4.6.4 (Management of EE), 4.4.6.5 (Downstream Accountability), 4.4.6.6 (Final Disposition), and 4.4.6.7 (Export), as well as the following requirements:

1. Verify business relationships downstream

Know & track HEW outputs to Final Disposition: Identify Process outputs from each facility that meet the e-Stewards definition of HEWs, and track and restrict these to Final Disposition as

required in this Standard. Obtain from each Downstream Processor the company name, contact information, facility and office address (physical location, including country), and type of operation for each Downstream Processor, Brokers involved, and Final Disposal facility for each HEW and their HEW by-products,

2. Confirm ongoing materials flow & records

Random sampling of shipping records: Annually obtain copies[62] (or visually inspect and create a detailed written report) of a sampling of a minimum of 3 randomly chosen months of outgoing Shipping Records from each Downstream Processor for each HEW throughout the Recycling Chain and compare with corresponding acknowledgements of receipt from next tier vendors, to ensure that shipments of HEWs have been transferred to and received by approved facilities in conformity with 4.4.6.6 (Final Disposition), and 4.4.6.7 (Export), including when Brokers are involved, and

3. Ensure Downstream Processors have an environmental health & safety management system: [no additional requirements].

(APPENDIX A continues below)

[62] Copies may be obtained directly from each Downstream Processor or via the Organization's Downstream Processors, but visual inspection of records shall be done by the Organization directly.

A.4.4.6.7 b)

e-Stewards Declaration…

…of Testing, Determination of Full Functionality, and Reuse Destination of Exported Used Electronic Equipment & Components in this Shipment

EXPORT INFORMATION	
Holder who arranges the transboundary movement (responsible for testing)	
Company name:	Contact name:
e-mail:	Phone:
Address:	Country:
Company responsible for evidence of functionality (if different than Holder)	
Company name:	Contact name:
e-mail:	Phone:
Address:	Country:
International Carrier	
Company name:	Contact name:
e-mail:	Phone:
Address:	Country:

IMPORT INFORMATION	
Importer	
Company name:	Contact name:
e-mail:	Phone:
Address:	Country:
User, Retailer, Distributor (if different than Importer)	
Company name:	Contact name:
E-mail:	Phone:
Address:	Country:

DECLARATION	
I, the holder of the Electronic Equipment listed below, hereby declare that prior to export the used equipment/components in this shipment, listed below, were tested and determined to be in good working condition and Fully Functional.* I also confirm that this equipment is being imported for the purpose of Direct Reuse** and not for repair, recycling, or Final Disposal.	Name: Signature: Date:

* **Fully Functional:** Electronic Equipment and/or components are "Fully Functional" when they are tested and demonstrated to meet or exceed the original functionality specifications for the product/component's Essential Functions, or if upgraded, the intended new specifications; are safe for use & handling, without electrical, physical, or fire hazards; do not contain any Hazardous Electronic Equipment which is non-functional (such as non-working circuit boards, mercury-containing devices, batteries, or CRTs), and which

perform the Essential Functions it needs to perform for the end consumer. **Essential Functions**: Product features which a user of an electronic product (equipment or component) can reasonably expect to be present based on the original or upgraded design and marketed description of the Electronic Equipment, and features without which safe or effective use would be unlikely.

** **Direct Reuse:** The continued use, by other than previous user, of Electronic Equipment and components after being tested and determined to be Fully Functional, without the necessity of (further) repair, provided that such continued use is for the originally intended, Repurposed, or upgraded purpose of Electronic Equipment and their components.

SHIPMENT INFORMATION

Official use	1 Type of Equipment ***	2 Model #	3 Serial # (if applicable)	4 Year	5 Date of Testing	6 Type of Tests Conducted and Test Results

*** For all rechargeable batteries going for reuse which power mobile computing devices (including laptops, notebooks, e-readers, and touch-pads):

- When a battery is shipped with the device it powers, identifying information for each battery shall be associated with the device it powers and only needs to include the type of testing conducted and the test results (in column 6), including each battery's state of health/minimum run time, and
- When a battery is not shipped with a device it will power (e.g. separated batteries), identifying information for each battery shall include all of the information (columns) required in this form, in addition to the tested power rating/run time on each used battery going for reuse.

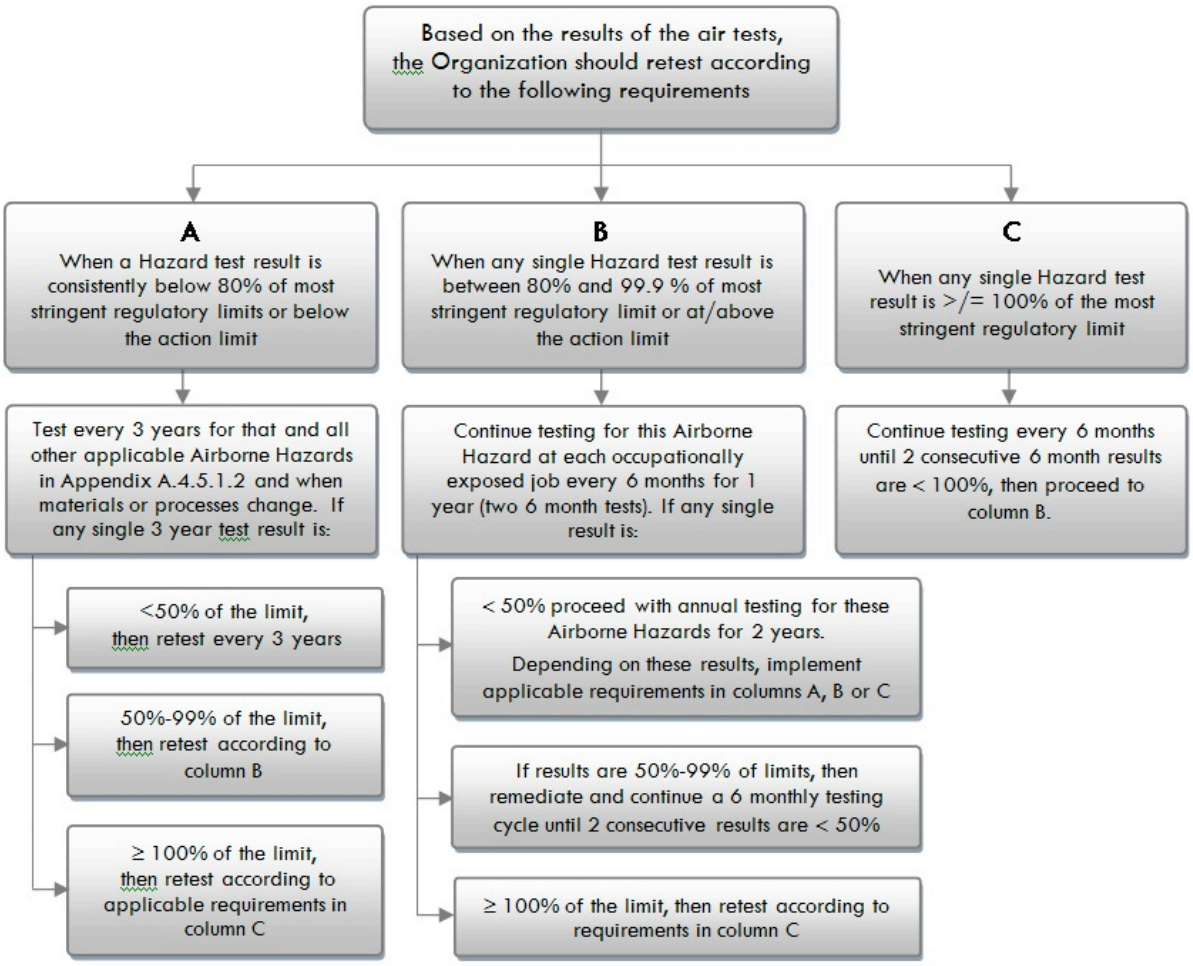
A.4.5.1.2 a) 2: Airborne hazards – Requirements for Testing

If an Organization is performing the following PHPT operations…	…then it shall perform and document Industrial Hygiene tests for the following airborne hazards:
Breaking, cutting, crushing, shredding, or pulverizing devices with cathode ray tubes, (such as CRT monitors and TVs), regardless of technologies or containment controls:	▸ Lead, cadmium, and compounds containing these heavy metals, Phosphors, and crystalline silica dust
Processing, removal, replacement, and/or disposal of mercury-containing components (such as fluorescent lamps in LCD screens):	▸ Mercury and mercury compounds, including in worker breath zones and areas around and on the floor below the mercury-removal and storage areas
Using power machinery to shred, cut, break, pulverize, crack, crush, bale, or chip Hazardous Electronic Equipment or Problematic Components and Materials which may contain these hazardous substances:	▸ Lead, beryllium, cadmium, asbestos, mercury, including compounds of these. If an Organization can demonstrate that the material being Processed and the Processing technology or its by-products do NOT contain one or more of these constituents, and can provide documented evidence of this fact[63], then they do not need to continue to test for the constituent, unless the material being Processed or the Processing technology changes.
Only using a shredder dedicated to hard drives (which contain circuit boards), but not using any other shredding or mechanical size reduction:	▸ Lead, beryllium, cadmium, including compounds of these, as well as fiberglass
Baling and/or shredding separated circuit boards:	▸ Lead, beryllium, fiberglass
Using thermal processes for melting, smelting, or combustion of Electronic Equipment:	▸ Inhalable hydrocarbons (including polycyclic aromatic hydrocarbons), and the elements beryllium, lead, mercury, and cadmium and all compounds of these elements. If it can be shown that the material being Processed and the Processing technology or its by-products do NOT contain one or more of these constituents, and can provide documented evidence of this fact[64], then they do not need to continue to test for the constituent, unless the material being Processed or the Processing technology changes.
Using acids or solvents for precious metals or plastics Materials Recovery, or cleaning procedures:	▸ Workplace exposure tests for any acid or solvent that is indicated as an inhalation hazard in the relevant MSDSs, as well as related digestive acid gases such as hydrogen sulfide, nitrous oxide, and other identified chemical hazards.

[63] For example, due to the Organization's restrictions on acceptance of certain materials and TCLP results indicating the incoming waste stream does not contain specific toxics, an Organization may provide objective evidence that testing is not necessary, at least under certain circumstances.

[64] ibid

A.4.5.1.2 f) 2. Testing frequencies for monitoring (retesting) of airborne hazards (Reference to regulatory limits or action levels below may include use of ACGIH TLVs as described in 4.4.6.1 a).



END OF APPENDIX A

APPENDIX B: ADMINISTRATIVE REQUIREMENTS FOR e-STEWARDS ORGANIZATIONS

The following requirements are applicable to all e-Stewards Organizations, in accordance with the e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment: Version 2.0©

a) General

e-Stewards certification is a voluntary, third-party certification system available to recyclers of electronic equipment globally (see 1.1.3 and 1.1.4). Only Organizations that have been audited by specially-trained and qualified auditors who are employed by accredited e-Stewards Certification Bodies and determined to conform to the e-Stewards Standard, and have signed a license agreement with the e-Stewards program administrator may be recognized as certified e-Stewards recyclers.

b) Scope of Certification

Corporate certification, within one country: The e-Stewards certification program requires certification of all Recycling facilities located within one country and owned (fully owned or owning a controlling interest) by an individual, corporate, organizational, or government entity. While individual Recycling facilities (Processing sites) may receive a site certification, all multi-sited e-Stewards entities shall eventually possess e-Stewards certification for all its eligible Recycling sites held within the entity(s), as well as all its electronics Recycling subsidiaries, regardless of brand, in order to be considered a licensed and valid certified e-Stewards entity. It is not a requirement that a parent company of a certified e-Stewards entity become certified, nor is it a requirement that any other subsidiaries owned by that parent become certified. However, if a certified e-Stewards entity owns another subsidiary that Processes or Controls Electronic Equipment, all subsidiary sites within the same country must also become e-Stewards certified concurrent with or subsequent to the e-Stewards parent company's certification, within 18 months of the initial site certification, irrespective of brand names used by entities. The rules [paragraph e) below] for "use of logo" shall always apply.

Ancillary Sites: When an Organization owns or Controls Ancillary Sites (e.g., collection sites, warehouses, or other non-Processing sites), each Ancillary Site shall be included in the scope of the Environmental Management System of the associated Recycling facility. Certification Bodies (CB's) do not, however, have to conduct on-site audits of Ancillary Sites, but may choose to in order to increase confidence of conformity to applicable requirements.

The certified e-Stewards Organization shall assure through its internal processes that the applicable elements of the environmental health and safety management system have been implemented at each Ancillary Site. When auditing a Recycling facility, the CB shall confirm that the applicable elements of the Standard are implemented and maintained as they apply to corresponding Ancillary Sites, including but not necessarily limited to internal auditing, material balance accounting, safety training, and downstream accountability.

Separate electronics Recycling companies with same ownership: If the top management or owner(s) of an e-Stewards entity also own or own a controlling interest in a separate electronics Recycling entity, all of these Recycling facilities are also required to become e-Stewards certified, regardless of brand names used by the entities, but the rules [paragraph e) below] for "use of logo" shall always apply.

Co-location: While it is permissible that a certified e-Stewards recycler is co-located with other entities, the e-Stewards recycler shall be responsible for controlling their operations in conformity with the Standard, including impacts of their operations upon co-located entities' areas. Additionally, a co-located e-Stewards Organization shall assure that their own workers, visitors, and customers on-site are protected against health and safety hazards caused by co-located entities.

c) Application to Certification Bodies (CB)

Only Certification Bodies which have been accredited under the ANAB e-Stewards® Program or another accreditation program approved by the e-Stewards program administrator are eligible to certify e-Stewards Organizations within the e-Stewards certification program. Unaccredited certificates are not permitted.

An e-Stewards applicant that meets the scope and eligibility requirements of this Standard may apply to any of the approved and accredited CB's that are listed in the www.e-Stewards.org website. When completing the application, the CB will request and the applicant shall provide information necessary to properly document and determine the required time to conduct the certification audits, including information as follows:

1. Has applicant disclosed all Recycling facilities and all Ancillary Sites that are located within the country?
2. Has applicant disclosed all activities being performed at all Ancillary Sites (Ancillary Sites may not perform any Recycling activities, as defined)?
3. Has applicant disclosed all subsidiary Recycling sites that are fully or majority owned by the same owner(s)?
4. Has applicant disclosed all other separate Recycling companies/entities that are fully or majority owned by the same owner(s) or top management?
5. Are data destruction services provided by the applicant? Describe.
6. What Potentially Hazardous Processing Technologies are employed (e.g. shredding, crushing, thermal or chemical processes, etc.)?
7. Has the applicant provided an accurate, up-to-date description or diagram indicating the extent of the Recycling Chain that begins with the applicant e-Stewards Organization and ends with Final Disposition of all Hazardous Electronic Waste, Problematic Components and Materials, and/or equipment/components going for reuse, which originated from the Organization's facility and/or Control?
8. Describe any exportation of Hazardous Electronic Waste and Electronic Equipment, directly or indirectly (e.g. through Downstream Processors or Intermediaries), including Electronic Equipment going for reuse, Recycling, and Final Disposal.
9. Is the applicant currently ISO 14001: 2004 certified by any ANAB-accredited CB, or a CB accredited by another accreditation body approved by the e-Stewards program administrator?
10. Is the applicant currently BS OHSAS 18001 certified?

d) Contracting with a CB

Once a CB has been selected, the e-Stewards applicant will be required to enter into a three-year contract, at a minimum, for audit and certification services covering all required sites to be certified within a given country. This contract shall include a surveillance plan requiring a series of routine surveillance audits which shall be conducted at least annually, but may be conducted more frequently. The applicant and CB shall agree upon the surveillance frequency that best meets the needs of the Organization and the CB's needs to assure conformity to the Standard. Surveillance audits may be announced or unannounced, and may be witnessed by BAN and/or its designated program administrator.

When the Organization to be certified consists of more than one site, it is required that the Organization contracts for the certification of all sites which are eligible and located in the same country. The Organization may elect to certify all sites at one time, or to certify them sequentially. However, all sites required to be certified shall be certified within 18 months of the initial certificate issuance. An Organization that fails to certify all of its required sites within 18 months shall have its certifications suspended or withdrawn. No sampling is permitted for auditing of multi-sited Organizations for the initial certification, but approved sampling methods may be permitted, as approved by the Certification Body, during the surveillance and re-certification stages.

If an eligible new site is opened or acquired after initial site certification, that site must be certified within 18 months of its opening or acquisition.

e) Certification and Use of Logo

When the CB has concluded and confirmed that all certification requirements are met, they must notify the program administrator who will then enter into a license agreement with the Organization. Only after a license agreement is signed can an e-Stewards certificate be issued by the CB. No delivery or announcement of certification shall be made until the certificate is issued. A Marketing and License Fee applies.

An Organization may only claim to meet this Standard and/or be a certified e-Stewards Organization if the Organization is both:

- Licensed to use the e-Stewards name and logo by BAN or the e-Stewards program administrator, and
- Currently certified by an e-Stewards accredited Certification Body.

The Basel Action Network (BAN) retains ownership of this Standard and its use. BAN may license a separate e-Stewards program administrator to manage and oversee the e-Stewards Standard and certification program on its behalf. Any individual, Organization, or entity utilizing the e-Stewards Standard, name, or logo for any commercial purpose or purposes other than reference are required to enter into a license agreement with the Basel Action Network, or the e-Stewards program administrator as required.

The e-Stewards name and logo are trademarked and the Standard is copyright protected by the Basel Action Network. Rules for the use of the logo are described in the e-Stewards Marketing and Licensing Agreement, which must be signed and executed before certification can be finalized.

Any proclamation of self-certification or self-declaration of conformity, or second party certification or declaration of conformity, to this Standard is strictly prohibited. Misrepresentation of the scope of certification may result in suspension or withdrawal of the certificate.

Any unauthorized use of the e-Stewards Standard (i.e. without written permission or under license), all or in part, is strictly prohibited.

f) Significant Changes Following Certification

The Organization shall make their CB aware of any significant changes to ownership, management, facilities, number of workers, Processing methods, emergencies, or other significant changes that may impact ongoing conformance with the Standard, within 14 business days of the change(s) or less if required by their CB. The Organization shall permit the CB to conduct an evaluation of the reported changes and their effects on conformance, including special on-site surveillance audits, as necessary.

g) Critical Non-Conformities

Certified e-Stewards recyclers and those which have contracted for certification are subject to the formal "Critical Nonconformity Policy" which may impose sanctions upon e-Stewards Organizations when and if objective evidence is established of egregious and/or dishonest practices which could bring disrepute upon the e-Stewards certification program. The Policy addresses non-conformities above and beyond the typical minor or major non-conformities that may be raised from time-to-time by the CB auditor during initial, surveillance, or re-certification audits of the Environmental Management System. The Critical Nonconformity Policy, including the e-Stewards appeals process, is located on the website at www.e-Stewards.org/cncpolicy.

h) Oversight by e-Stewards Program Administrator

An Organization shall permit any reasonable level of oversight by the e-Stewards program administrator, or a third party designated by them, of any and all audit and certification activities, including records providing evidence of such. This shall include the program administrator witnessing some onsite audits. Findings shall normally not be released to any third party. However, in cases involving a Critical Nonconformity raised by the e-Stewards program administrator, evidence of Critical Non-Conformities may be used in any way that protects the e-Stewards Certification Program and program administrator.

i) Data Reporting Requirements

The e-Stewards Standard requires that the e-Stewards Organization reports selected informational and performance data to the e-Stewards database (https://apps.e-stewards.org/database) prior to Certification and on a regular basis as defined in the Standard. The Organization shall inform their CB of the person(s) responsible for uploading this data.

END OF APPENDIX B

APPENDIX C: REQUIREMENTS FOR e-STEWARDS CERTIFICATION BODIES AND ACCREDITATION BODIES

The following requirements are applicable to qualified accreditation bodies (AB's) and certification bodies (CB's) which are performing audits and certifying e-Stewards recyclers in accordance with the e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment©, including the latest version of the corresponding Sanctioned Interpretations of the Standard. It is noted that the requirements of the e-Stewards Standard may be altered by the issuance of Sanctioned Interpretations by the e-Stewards program administrator between official versions of the Standard. During transition periods between versions of the Standard, each Standard version may have a unique set of Sanctioned Interpretations applicable. These are posted on the e-Stewards website and shall be binding upon AB's, CB's, and e-Stewards Organizations at all stages.

a) Accreditation of Certification Bodies

Only CB's which have been accredited under the ANAB e-Stewards® Program or another accreditation program approved by the e-Stewards program administrator are eligible to participate in the e-Stewards certification program.

Interested CB's shall first submit a pre-application to the e-Stewards program administrator and be pre-approved in accordance with the e-Stewards CB pre-approval criteria before the application to any qualified e-Stewards Accreditation Body is made. An application fee shall apply.

The e-Stewards program administrator requires that any CB operating within the e-Stewards certification program must demonstrate initial and ongoing satisfactory performance. Satisfactory performance is defined by both adherence to e-Stewards AB rules and the e-Stewards Critical Nonconformity Policy, as well as additional performance measures defined by the e-Stewards program administrator as documented in this Appendix and the current e-Stewards Sanctioned Interpretations. The following are likely to constitute unsatisfactory performance:

1. The CB is not current with any licensing fees required by the e-Stewards program administrator;
2. The CB fails to report certification data as required by Appendix C, paragraph h) of the e-Stewards Standard within 5 business days of initial certification or any certification status changes;
3. The CB has been suspended by an AB approved by the e-Stewards program administrator for non-conformance with ISO 14001 or any industry specific standard (e.g., TL 9000, AS9001) more than once within three years;
4. The e-Stewards CB has been suspended by an AB approved by the e-Stewards program administrator for non-conformance with the e-Stewards program requirements; and/or
5. The CB has operated in any other manner which, at the sole discretion of program administrator's executive management, could bring disrepute to the e-Stewards certification program or the e-Stewards program administrator.

The e-Stewards program administrator will consider the implications of any evidence of unsatisfactory performance, and will make its judgment for action based upon these implications. Corrective action by the CB may be required by the e-Stewards program administrator. Failure to

demonstrate satisfactory performance and/or failure to implement effective required corrective actions may suspend a CB's right to participate in the e-Stewards program for up to three years following the infraction.

The suspension action and duration of suspension will be determined solely at the e-Stewards program administrator's discretion, and there shall be no refund of any application or licensing fees collected.

b) Copyrights

Accredited e-Stewards CB's will be granted the right to use the e-Stewards® mark and Standard(s) in conjunction with their marketing and certification programs. CB's shall be required to sign a Licensing Agreement with the e-Stewards program administrator that controls the use of the e-Stewards registered logo and trademark. A licensing fee is applicable, levied upon accredited CB's in accordance with the program administrator's license fee structure.

Participating CB's shall strictly observe the copyright restrictions related to the e-Stewards Standard(s), which are described inside the title page of this Standard, and the copyrighted restrictions related to the e-Stewards mark, which are described in program administrator's licensing agreement.

The CB shall protect the e-Stewards mark and name from misuse by the CB and by any of its certified clients through the same due diligence required of auditors to guard against misuse of the CB or AB logo.

c) Applications to CB's for e-Stewards Certification and Scope of Certification

All requirements located in Appendix B, letter b) also apply here.

Organizations may provide a range of Recycling services which must be understood and considered during the preparation of a quotation for auditing and certification, and subsequent audit planning. Applications which are provided and received by CB's shall specifically require information needed to identify the scope of services provided by each Organization, relative to the Standard, in order to determine which Recycling facilities and Ancillary Sites [see d) below] are both eligible for and required to fall under e-Stewards certification. Therefore, Organizations must provide CB's with information to determine the following:

1. Has applicant disclosed all Recycling facilities and all Ancillary Sites that are located within the country?
2. Has applicant disclosed all activities being performed at all Ancillary Sites (Ancillary Sites may not perform any Recycling activities, as defined)?
3. Has applicant disclosed all subsidiary Recycling sites that are majority owned by the same owner(s)?
4. Has applicant disclosed all other separate Recycling companies that are majority-owned by the same owner(s) or top management?
5. Are data destruction services provided by the applicant? Describe.
6. What Potentially Hazardous Processing Technologies are employed (e.g., shredding, crushing, thermal or chemical processes, etc.)?

7. Has the applicant provided an accurate, up-to-date description or diagram indicating the extent of the Recycling Chain that begins with the Organization and ends with Final Disposition of all Hazardous Electronic Waste, Problematic Components and Materials, and/or equipment/components going for reuse, which originated from the Organization's facility or Control?
8. Describe any exportation of Hazardous Electronic Waste and Electronic Equipment, directly or indirectly (e.g., through downstream vendors), including Electronic Equipment going for reuse, Recycling, and disposal.
9. Is the applicant currently ISO 14001: 2004 certified by any ANAB-accredited CB, or a CB accredited by another accreditation body approved by the e-Stewards program administrator?
10. Is the applicant currently certified to BS OHSAS 18001?

Prior to conducting any certification audit, the CB shall assure that all affiliated sites (i.e., other Recycling sites, including any subsidiary sites or others owned by the e-Stewards owner, regardless of brand), of the contracting organization are also contracted for certification within 18 months of the certification date of the initial site.

d) Audit Person-Days and Audit Planning

When quoting e-Stewards certification services, the CB shall consider the information required at the application stage (Section c) and quote not less than 150% of audit days than would be quoted for simple, accredited ISO 14001: 2004 certification of the same Organization. International Accreditation Forum (IAF) Mandatory Document for Duration of QMS and EMS Audits, IAF MD 5 - current version (see www.iaf.nu), shall be the basis for this determination.

If the Organization requesting e-Stewards certification services is already ISO 14001:2004 certified, the CB may reduce the audit days calculated for the initial e-Stewards certification audit by no more than 50% from the above calculated audit days to account for this existing certification. The 50% maximum reduction refers to upgrades from an existing ISO 14001audit as a unique event. If the upgrade is planned to be conducted coincident with a pre-planned ISO 14001 surveillance audit, the (up to) 50% reduction pertains only to the e-Stewards-specific portion of the Standard. The number of audit days that would have been spent conducting the routine surveillance or renewal of the existing ISO 14001 certification must be added to the days calculated for the e-Stewards audit.

If the applicant is also already certified to BS OHSAS 18001, the CB shall comply with the requirements of IAF MD 11 when determining what further reductions in minimum audit days are allowable.

Ancillary Sites[65] owned or Controlled by a certified e-Stewards Organization shall be included and documented within the Organization's management system, and applicable operations at Ancillary Sites shall be addressed by the management system, including material balance accounting, internal audit, and downstream accountability. However, the CB need not routinely audit these Ancillary Sites for conformity and these sites shall not appear on the certificate of conformity for the Organization. Auditors should verify, through available objective evidence, that Ancillary Sites are addressed in the management system. Ancillary Sites that are proximate to the Processing site

[65] Please note that Ancillary Sites are not allowed to perform Recycling activities such as dismantling, shredding, exporting, or refurbishing Electronic Equipment (see definition of Ancillary Sites). If so, they shall be considered to be Recycling (Processing) sites, requiring certification.

being certified may be visited, as time permits during routine audits by Auditors, as a means to confirm that appropriate system controls are in place at Ancillary Sites. Otherwise, Auditors should seek evidence of such controls during Recycling facility audits associated with any particular Ancillary Site.

CB's are encouraged to respect the work of and certifications issued by other accredited CB's, relevant to the e-Stewards Standard. Objective evidence of current certification to ISO 14001 by another accredited CB shall be considered in the planning of an e-Stewards audit and associated quotation for services with the intention of minimizing redundancy and maximizing value for the e-Stewards Organization.

e) Contracting with the e-Stewards Organization

CB contracts with all e-Stewards Organizations shall include the following special conditions above and beyond standard contract terms:

1. Organizations shall permit both announced and unannounced audits, including special surveillance audits, by the CB, and/or the program administrator as part of their oversight functions,
2. Organizations shall agree to and allow the CB to share any audit or certification related information with the e-Stewards program administrator upon request by program administrator during or after the contract period,
3. The e-Stewards program administrator is permitted to join any audit as witness,
4. Organizations shall execute a License Agreement with the e-Stewards program administrator prior to receiving their certificate(s) from their CB,
5. All Recycling facilities which Process, manage, or Control Electronic Equipment and are owned or controlled by the Organization shall be included in the contract for certification within 18 months of certification of the initial facility, and
6. All Ancillary Sites which are owned or Controlled by the Organization shall be included and managed appropriately in the scope of the management system.

f) Multi-Site Certification

Organizations with more than one Recycling site must certify all Recycling sites that are majority-owned, franchised, or otherwise legally and operationally Controlled by the client and which are located within the country of the applicant site(s) in order to attain a corporate certification [see letter c) and Appendix B, letter b) above for description of facilities that are required to become certified].

When a multi-sited Organization requests certification, the CB shall not permit any certification process to begin unless all Recycling sites located in that country are contracted for e-Stewards certification. Certifications of other sites under the same ownership shall be completed within 18 months of the initial site certification. When multiple CB's are involved in an Organization's corporate certification, the CB that has certified the headquarters site shall be the CB of record for the corporate certification.

On the lead-up to achieving corporate certification, individual site certificates may be granted. These certificates, however, shall be revoked if all required sites are not certified within 18 months.

Site sampling shall NOT be permitted for the initial certification of any of the company's sites, but may be followed, if allowable in accordance with IAF Mandatory Document for the Certification of Multiple Sites Based on Sampling, IAF MD 1 (current version) after each site has been initially audited and certified (i.e., sampling may be permissible during the surveillance mode and/or recertification).

g) e-Stewards Audit Reporting Requirements

All CB audit reports shall be in English language and clearly indicate that each of the following critical principles was covered during the audits (including surveillance audits):

1. No prohibited export of Hazardous e-Waste or equipment going for reuse,
2. Data security is assured for all customers,
3. Workers are systematically protected from toxic exposures, illness, and injury, and housekeeping and Industrial Hygiene practices minimize migration and take home exposures,
4. Safe practices are defined and followed for handling Hazardous Electronic Equipment,
5. Hazardous e-Wastes (including untested equipment and components destined for refurbishment) are identified and followed to acceptable Final Disposition,
6. Material balance accountings are verified as calculated by the Organization.

For these critical areas (1 - 6 above), the auditor should document how Standard conformity was established by addressing the following:

- Which departments were visited and reviewed for this determination?
- What records were reviewed, including dates and subject matter?
- What observations were made against the Standard and/or documented system requirements?
- Which sites were visited?

h) Data Collection and Reporting

The CB shall report to the e-Stewards program administrator every contract signed in a timely manner following signature.

The CB shall establish employee head count at the application phase, and verify at the initial certification audit and all subsequent routine audits. This information shall be used to assure proper audit time during the course of the certification contract.

Prior to initial certification and at each surveillance audit the CB shall confirm that the certified has a current licensing agreement in place with the e-Stewards program administrator.

During and subsequent to certification, the CB shall assure that use of the e-Stewards logo by the e-Stewards Organization is in accordance with the licensing agreement.

The CB audit teams shall verify, as an element of each audit, that the e-Stewards Organization has reported all required performance data to the designated data repository.

The CB shall report all e-Stewards certifications to the e-Stewards program administrator within 5 business days of certification. Any changes to certification status (i.e., suspension, withdrawal, cancellation) shall be reported to the e-Stewards program administrator within 5 business days.

i) Certificate Issuance

The CB shall issue a site or corporate certificate(s) indicating conformance of the e-Stewards Organization with all applicable requirements of the Standard when and only when:

- All non-conformances have been cleared by review and approval of a suitable corrective action plan in accordance with ISO 17021 paragraph 9.1.15 requirements, and subsequently
- The CB has confirmed that the Organization has a valid and current licensing agreement in place with the e-Stewards program administrator for the use of the e-Stewards name and logo.

The CB shall not issue, or shall withdraw or suspend, as appropriate, a certificate to an Organization if the e-Stewards program administrator has issued a Critical Nonconformity to that Organization until and unless the program administrator has cleared the Critical Nonconformity, in writing.

The certificate issued shall bear the logo of the CB, the AB, and the e-Stewards logo (as provided by the e-Stewards program administrator to the CB in conjunction with its Licensing Agreement). No unaccredited e-Stewards certificates may be issued by a CB.

The e-Stewards certificate issued by the CB may reference concurrent certification with ISO 14001, or the two certificates can be issued separately.

If a change in ownership, a bankruptcy filing, potential Critical Nonconformity, or another significant change or event occurs which could affect the certified e-Steward's capability or conformity with the Standard, the CB shall notify the e-Stewards program administrator of the circumstances within 5 working days, and follow the requirements of ISO 17021 with regard to assuring continual conformance with the Standard. The e-Stewards program administrator requires that a special surveillance audit be conducted of any such-affected certified sites within a maximum of six months of notification, or sooner in exceptional circumstances.

j) Ongoing Training and Qualifications of e-Stewards CB and AB Auditors

The e-Stewards CB and AB program managers and auditors shall participate in refresher/retraining courses at least once every three years. Additionally, when new versions of the e-Stewards Standard are released, an upgrade training provided by the e-Stewards program administrator designated training organization shall be required prior to auditors auditing to the new version of the Standard.

k) Agreement to Oversight of the Certification Process by the e-Stewards Program Administrator

The AB and CB shall agree to a reasonable level of oversight by the e-Stewards program administrator. This oversight may include witnessing of the initial accreditation office audit and witnessed audit, review of AB and CB documents and procedures related to the e-Stewards program, witnessing of CB audits of e-Stewards applicants and/or certified e-Stewards, CB headquarters visits, and review or witnessing of other AB or CB events that the program administrator considers to be relevant to its oversight of the e-Stewards program.

To facilitate this oversight, CB's shall submit to the e-Stewards program administrator a monthly report which notifies and routinely updates it of the following:

1. New e-Stewards quotations issued since last monthly report,

2. New e-Stewards contracts (company and site locations) issued since last monthly report,
3. Confirmed e-Stewards audits (initial, surveillance, special, or renewal) scheduled within the next 60 days from the current report including sites/locations to be audited and specific auditors assigned, and
4. New certificates issued, suspended or withdrawn since last monthly report.

Accreditation Bodies shall report to the e-Stewards program administrator, on a monthly basis, the schedule for the upcoming 60-days, of any applicant CB audits and current e-Stewards CB office and witnessed field audits that are planned, including dates, locations, and CB's to be witnessed.

END OF APPENDIX C

APPENDIX D – GUIDANCE DOCUMENT

The Guidance Document for the e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment: Version 2.0© is a work in progress which will be updated on a continuous basis as new information becomes available on best practices. This document is not binding on e-Stewards Organizations but is for guidance and explanation purposes. However, this document is an essential adjunct for implementation and understanding of this Standard, and its placement on the Worldwide Web is only to facilitate fluid improvement and updating. It is located in its most current version on the Worldwide Web at: www.e-stewards.org.

Basel Action Network

206 First Ave. S. Suite 410

Seattle, WA 98104 USA

Phone: +1.206.652.5555, Fax: +1.206.652.5750

e-mail: inform@ban.org

Websites: www.e-Stewards.org

www.ban.org

R2:2013

THE RESPONSIBLE RECYCLING

("R2")

STANDARD

For

ELECTRONICS RECYCLERS

Effective Date: SEPTEMBER 1 2014

TABLE OF CONTENTS

INTRODUCTION

This document – the R2:2013 Standard – establishes responsible recycling ("R2") practices for the recycling of electronics globally. By certifying to this Standard through an accredited third-party Certification Body, electronics recyclers[1] can help prospective purchasers of their services (customers) make informed decisions and have increased confidence that used and end-of-life electronic equipment are managed in an environmentally responsible manner, protective of the health and safety of workers and the public, and that all data on all media devices is secure until destroyed. Thus, certification to R2:2013 allows electronics recyclers to highlight their value to customers, employees, their community and the public.

R2:2013 was developed by a multi-stakeholder group – the R2 Technical Advisory Committee (TAC) – through an open, transparent, and consensus-based approach in conformance with generally accepted principles for consensus-based standards. The TAC itself consists of representatives from key stakeholder groups, including: recyclers, customers/users of recycling services, regulatory and procurement agencies, manufacturers of electronic equipment, downstream vendors of recyclers, and international trade experts. The process for development of R2:2013 included public comment, response to comments, and an appeals opportunity so that all interested parties had the ability to participate in the revision process. Following completion of this process, R2:2013 was reviewed and adopted by the SERI Board of Directors.

Comprehensive

The requirements contained within R2:2013 are comprehensive, covering environmental, health and safety, and data security practices. To further ensure the integrity and strength of the Standard, R2:2013 now requires facilities to obtain certification to one or more generally-accepted environmental, health and safety management systems.

Legal

The R2:2013 Standard specifically requires that international trade in used and end-of-life electronics be conducted legally and responsibly. This requirement is made explicit in R2:2013, by requiring compliance (including documentation) with the laws and regulations of all importing, transit, and exporting countries. Further, if a requirement of this document conflicts with an applicable legal requirement, the recycler must adhere to the legal requirement.

Conformance

All the provisions of this R2:2013 Standard shall be conformed to by R2:2013 electronics recyclers. Whether conformed to directly, or through a contracted third party, the burden of proof resides with the R2:2013 electronics recycler to demonstrate conformity to each requirement. It is acceptable to outsource certain activities and requirements under the Standard to partners or downstream vendors. However, it is the responsibility of the R2:2013 electronics recycler to ensure that these downstream partners and vendors conform to the requirements of the R2:2013 Standard.

[1] When referred to in this Standard, the term "recycler" encompasses all entities in the recycling chain, including brokers, refurbishers, collectors, resellers, etc. The term "recycler" is used for simplicity of language throughout. "Recycler" is defined in the Definitions Section at the end of this document.

Applicability
The R2:2013 Standard is applicable to all organizations within the recycling chain, regardless of their size or location.

R2:2013 certification is specific to a facility, and not to a company. The R2:2013 Standard shall apply to all electronics recycling related activities at a physical address. It may be extended to multiple physical addresses through a multi-site certificate or additional individual certificates. It may also be extended as a multi-site sampling certificate when the management system is shared by multiple locations in accordance with the International Accreditation Forum Mandatory Documents 1 and 5.

Related Document – R2 Code of Practices
The R2 Code of Practices is a supporting document defining the processes used in applying and administering the R2:2013 Standard. It contains requirements designed to facilitate R2:2013 audit consistency, including requirements related to SERI's oversight of the R2:2013 certification process. Allowances for certain requirements are specifically defined in the R2 Code of Practices. Allowances will only be made where provisions are clearly not applicable to the facility within the recycling chain, and where allowances will not negatively impact the validity of the certification.

About SERI
SERI is the non-profit organization established to administer and promote the R2 Standard. It consists of an independent Board of Directors and a staff. In addition, the R2 Technical Advisory Committee is a voluntary group of concerned stakeholders appointed by the SERIBoard and charged with the responsibility for maintaining the integrity and effectiveness of the R2 Standard and related guidance. SERI is the authoritative administrator and owner of the R2:2013 Standard. Additional resources and information are available at http://www.sustainableelectronics.org.

THE R2:2013 REQUIREMENTS

1. **Environmental, Health, and Safety Management System**

General Principle – *An R2:2013 electronics recycler shall possess and use an Environmental, Health, and Safety Management System (EHSMS) to plan and monitor its environmental, health, and safety practices, including the activities it undertakes to conform to each requirement of the R2:2013 Standard. This EHSMS shall be certified to an accredited management system standard.*

Requirements:

(a) An R2:2013 electronics recycler shall document the scope of activities included in the R2:2013 and EHSMS certifications, including any allowance to the R2:2013 standard expressly listed in the R2 Code of Practices and authorized in writing by the Certification Body.

(b) An R2:2013 electronics recycler shall be certified, throughout the duration of its R2 certification, to one or more environmental, health and safety management system standards (EHSMS) that have been approved by SERI[2]. The R2:2013 electronics recycler shall be certified to the standard(s) and R2:2013 by an independent, Accredited Certification Body.

(c) An R2:2013 electronics recycler shall develop, document, fully implement, review at least annually through internal audits, and update as needed (e.g., as operations, products and/or technologies change) this written EHSMS, which shall include:

(1) Written goals and procedures covering, and requiring the organization to systematically manage, its on-site and downstream environmental, health, safety, and data security matters in a manner consistent with each requirement of the R2:2013 Standard, and

(2) A list of the activities necessary to conform to each requirement of R2:2013, a list of the documentation necessary to show conformity with these requirements, and a commitment to take corrective action to address any issues of non-conformance.

2. **"Reuse, Recover, ..." Hierarchy of Responsible Management Strategies**

General Principle – *An R2:2013 electronics recycler shall develop and adhere to a policy for managing used and end-of-life electronic equipment that is based on a "reuse, recover…" hierarchy of responsible management strategies.*

Requirements:

(a) An R2:2013 electronics recycler shall develop in writing and adhere to a policy stating how it manages used and end-of-life electronics equipment, components, and materials – with respect to both on-site activities and the selection of downstream vendors – that is based on a hierarchy of responsible management strategies:

(1) Reuse – An R2:2013 electronics recycler shall take all practical steps to direct tested equipment and components to reuse and resale, and to direct equipment capable of repair to qualified refurbishers, unless a customer directs otherwise (See Provision 6 for further

[2] As of July 1, 2013, SERI has approved RIOS™, or a combination of both ISO 14001 and OHSAS 18001, to fulfill this requirement. In the future, additional EHSMS standards may be approved. At such time, they will be listed on the SERI website (SERIwww.sustainableelectonics.org).

discussion).

(2) Materials Recovery – An R2:2013 electronics recycler shall take all practical steps to separate as appropriate, through manual dismantling and/or mechanical processing, the materials in equipment and components that are not directed to reuse or refurbishment and direct them to properly-equipped materials recovery facilities.

(3) Energy Recovery or Land Disposal – An R2:2013 electronics recycler shall not direct material[3] to incineration, energy recovery, or land disposal facilities unless no reuse or recycling options are viable. (See Provision 5(d) for the relevant requirements.)

(b) This policy shall incorporate and be consistent with the Focus Material (FM) Management Plan that the R2:2013 electronics recycler develops in accordance with Provision 5.

3. **Legal Requirements**

General Principle – *An R2:2013 electronics recycler shall comply with all applicable environmental, health and safety, and data security legal requirements and shall only import and export equipment and components containing Focus Materials in full compliance with all applicable importing, transit, and exporting countries' laws.*

Requirements:

(a) An R2:2013 electronics recycler shall develop a legal compliance plan to maintain full compliance with all environmental, health, safety, and data security legal requirements applicable to its operations, as well as full compliance with all applicable import and export laws covering shipments of FMs and shipments of untested or non-functioning equipment or components containing FMs. This plan shall be included as a section of its EHSMS.

(1) Facility Compliance: The plan shall identify and document the environmental, health, safety, and data security legal requirements that cover the recycler's operations.

(2) Import/Export Compliance: The plan also shall identify and document the legality – under the laws of the exporting, transit, and importing countries – of all international shipments of FMs and untested or non-functioning equipment or components containing FMs, that have passed through the R2:2013 electronics recycler's facility or control[4]. Prior to shipment, the recycler shall identify the countries that are receiving or transferring such shipments, obtain documentation demonstrating that each such country[5] legally accepts such shipments, and demonstrate compliance of each shipment with the applicable export and import laws.

The documentation shall be in a language understandable to the electronics recycler, and consist of original documentation from the importing or exporting country's Competent Authority or a copy of a law or court ruling, that demonstrates the import country legally accepts such imports, and the export country legally allows such exports.

(3) The recycler shall keep the legal compliance plan up to date, identify and implement the steps necessary to comply with each requirement, and document the implementation of these steps. It shall also periodically audit its compliance with legal requirements, and take corrective action to address any issues of non-compliance.

[3] This includes materials with substances identified in the R2 recyclers' risk assessment of potential hazards in compliance with provision 4(c).
[4] This includes shipments made by any downstream vendors.
[5] This includes both OECD (Organization for Economic Co-operation and Development) and non-OECD countries.

4. **On-Site Environment, Health, and Safety**

General Principle – An *R2:2013 electronics recycler shall use practices and controls at its facilities that protect worker and public health and safety and the environment under both normal and (reasonably foreseeable) exceptional circumstances.*

Requirements:

General

(a) An R2:2013 electronics recycler shall demonstrate the expertise, knowledge, and technical capability to process each type of equipment, component, and material it accepts in a manner that is legal and protective of worker safety, public health, and the environment.

(b) An R2:2013 electronics recycler shall adhere to good housekeeping standards, including keeping all work and storage areas clean and orderly. Housekeeping for all areas of the facility shall be planned, regularly implemented, and monitored.

Workforce and Environmental Protection

(c) An R2:2013 electronics recycler shall conduct on an ongoing basis (e.g., as new types of materials are processed or new processes are used) a hazards identification and assessment of occupational health and safety and environmental risks that exist or could reasonably be expected to develop at the facility. Such risks could result from any sources, including but not limited to emissions of and/or exposure to substances[6], noise, ergonomic factors, thermal stress, substandard machine guarding, cuts and abrasions, etc. The hazards identification and assessment shall be captured in writing and incorporated as a component of the recycler's EHSMS.

(d) An R2:2013 electronics recycler shall manage the environmental, health and safety hazards, minimize the risks it identifies, and prioritize the use of appropriate strategies to implement and maintain controls, including but not limited to:

(1) Engineering controls such as:

(A) Substitution (e.g., replacing a toxic solvent with one less toxic)
(B) Isolation (e.g., automating a process to avoid employee exposure)
(C) Ventilation and, if appropriate, capture (e.g., fume hood)
(D) Dust control, capture, and clean up
(E) Emergency shut-off systems
(F) Fire suppression systems

[6] Risks posed by exposure to substances may arise in a variety of situations – sometimes involving substances that do not under ordinary conditions pose a risk to worker safety or the environment. Such substances may include mercury, lead, beryllium, cadmium, PCBs, some phosphor compounds, certain brominated flame retardants (i.e., polybrominated biphenyls, pentabrominated diphenyl ether, and octabrominated diphenyl ether), silica dust, chlorinated or brominated dibenzodioxins and dibenzofurans, and hexavalent chromium. Special attention should be given to potential lead and cadmium exposures during the creation or handling of broken CRT glass, as well as where lead solder is melted during chip recovery.

(2) Administrative and work practice controls, including appropriate combinations of:

(A) Regular, documented environmental, and health and safety training that covers information from the hazards assessment, as well as safe management handling, spill prevention, engineering controls, equipment safety, and use and care of personal protection equipment along with training for new hires and refresher courses for all employees that is understandable to them given language and level-of-education considerations; and
(B) Job rotation as feasible given workforce size, and
(C) Safe work practices, and
(D) Medical surveillance, and
(E) Safety and environmental meetings.

(3) Personal protective equipment, including respirators, protective eyewear, cut-resistant gloves, etc., as appropriate for the risks involved in the tasks being performed.

(e) An R2:2013 electronics recycler shall use monitoring and sampling protocols as applicable to provide assurances that the practices and EHSMS controls it employs are effectively and continuously managing the risks it has identified. This includes complying with all applicable environmental and health and safety regulations and permissible exposure limits (PELs) for sampling and/or monitoring.

(f) An R2:2013 electronics recycler shall treat its entire workforce, including volunteer workers, consultants, temporary workers, and anyone else performing activities under its direction, using the standard of care established pursuant to Section (d) of this provision.

(g) An R2:2013 electronics recycler shall designate a qualified employee(s) or consultant(s) to coordinate its efforts to promote worker health and safety and environmental protection. This designated individual(s) shall be identified to all employees and two-way communication shall be encouraged between employees and this individual regarding potential hazards and how best to address them.

(h) An R2:2013 electronics recycler shall identify probable emergency situations and exceptional circumstances. R2:2013 electronics recyclers shall prepare, periodically test, and update, as appropriate and necessary, an emergency plan(s) for responding to the identified emergency situations and exceptional circumstances to protect workers (subject to Section (f)), the public, and the environment. Occurrence of emergency events, including exceptional releases, accidents, spills, fires, and explosions shall be reported to the required authorities.

5. **Focus Materials**

General Principle – *An R2:2013 electronics recycler shall manage – both on-site and in the selection of downstream vendors – the Focus Materials that pass through its facility or control in a manner protective of worker health and safety, public health, and the environment. An R2 electronics recycler also shall perform due diligence on downstream vendors to which it ships these materials.*

Requirements:

Development and Adherence to an FM Management Plan

(a) An R2:2013 electronics recycler shall analyze, plan, regularly review, and update as necessary how the FMs that pass through its facility or control will be properly managed both on-site and down the Recycling Chain (and include this analysis and plan as the "FM Management Plan" section of its EHSMS). The FM Management Plan shall state how the recycler and its downstream vendors shall conform to the requirements set forth in the rest of this Provision 5.

Removal of FMs

(b) Prior to shredding or materials recovery of equipment or components, FMs (as well as print cartridges) shall be removed using safe and effective[7] mechanical processing or manual dismantling, with two exceptions:

(1) Items containing mercury if:

(A) They are too small to remove safely at reasonable cost, and
(B) Workers are protected from the potential risks of handling mercury, and
(C) The materials recovery occurs in facilities that meet all applicable regulatory requirements to receive and process mercury, and that use technology designed to safely and effectively manage equipment or components containing mercury.

(2) CRTs, batteries, and circuit boards contained in equipment or components destined for materials recovery need not be removed prior to shredding and/or materials recovery if the shredding and/or materials recovery occurs in facilities that meet all applicable regulatory requirements to receive these FMs, and that use technology designed to safely and effectively manage equipment or components containing these FMs.

Processing, Recovery, and Treatment of FMs

(c) An R2:2013 electronics recycler shall send removed FMs to processing, recovery, or treatment facilities that meet all applicable regulatory requirements to receive the FMs, and that use technology designed and operated to safely and effectively manage the FMs. This shall include:

(1) For items containing mercury – mercury retorting or other legal methods, excluding incineration,

(2) For circuit boards – removal of batteries and mercury, and processing for metals recovery, and

(3) For items containing polychlorinated biphenyls (PCBs) – technology specifically designed for PCB destruction, occurring in facilities that meet all applicable regulatory requirements, and that use technology designed to safely and effectively manage equipment or components containing these FMs.

[7] See Provision 4 for a discussion of "safe and effective" practices and controls.

Prohibition on Energy Recovery, Incineration, and Land Disposal of FMs

(d) An R2:2013 electronics recycler shall not use energy recovery, incineration, or land disposal as a management strategy for FMs or equipment and components containing FMs unless applicable law requires the use of a specific technology (e.g., thermal destruction of PCBs). However, if documented extreme and rare circumstances beyond the control of the R2:2013 electronics recycler disrupts its normal management of an FM, it may consider using these technologies to the extent allowed under applicable law until normal management is again possible.

Selection and Ongoing Due Diligence of Downstream Vendors for FMs[8]

(e) For shipments of removed FMs, and shipments of equipment and components containing FMs, an R2:2013 electronics recycler shall select both domestic and international downstream vendors that:

(1) Conform to the R2:2013 electronics recycler's FM Management Plan (developed in accordance with and including the requirements set forth in Sections (b) - (d) above), and

(2) Adhere to a documented system to manage environmental, health, and safety risks and legal requirements. The management system shall include at a minimum the components of Provision 3 (Legal Requirements and Provision 4 (On-Site Environmental, Health, and Safety), and

(3) Comply with all applicable environmental and health and safety legal requirements and maintain a current list of its environmental permits and copies of each, and

(4) Conform to this Section (e) and Section (f) below, or allow the R2:2013 electronics recycler to confirm this information with each of its relevant downstream vendors, thereby establishing that each facility in the Recycling Chain conforms to these subsections, and

(5) Conform to Provision 6 (Reuse), if applicable, and

(6) Conform to Provision 7 (Tracking Throughput), documenting the flow of all FMs down the Recycling Chain, and

(7) Conform to Provision 10 (Physical Security), ensuring security of the equipment down the recycling chain.

(f) An R2:2013 electronics recycler shall confirm at least annually and document, through audits or other similarly effective means, that each downstream facility to which Section (e) applies continues to conform to the requirements of Section (e) for as long as it receives FMs directly or indirectly from the R2:2013 electronics recycler.

(g) If the R2:2013 electronics recycler uses an R2:2013 certified downstream facility, then verification of conformance to 5(e)(1) and 5(e)(6) satisfies the due diligence requirements of 5(e) and 5(f).

Non-Focus Materials Requiring Specific Management

(h) An R2:2013 electronics recycler shall manage print cartridges in accordance with Provision 2 through print cartridge remanufacturers, recyclers, or Original Equipment Manufacturers (OEM), in facilities that meet all applicable regulatory requirements to receive these print cartridges, and

[8] The R2:2013 electronics recycler is only responsible for due diligence related to the Focus Materials shipped by the R2:2013 electronics recycler.

that use technology designed to safely and effectively manage print cartridges, including both ink and toner.

6. **Reusable Equipment and Components**

General Principle: *An R2:2013 electronics recycler shall repair and refurbish as needed, properly test, and adequately package equipment and components going to reuse to ensure continued use of the equipment and, ultimately, responsible recycling of Focus Materials.*

Requirements:

(a) An R2:2013 electronics recycler shall not allow equipment or components to be sold or donated for reuse if contrary to commercial agreements with those from whom the equipment or components were received.

(b) An R2:2013 electronics recycler shall, with respect to equipment and components it ships downstream:

(1) Label and sort each shipment in a manner sufficient to track throughput in conformity with Provision 7, and

(2) Ensure that all data is sanitized in conformity with Provision 8, and,

(3) Handle and package shipments to prevent damage in conformity with Provision 12.

(c) An R2:2013 electronics recycler shall, prior to shipping used electronics equipment and components that contain FMs, either domestically or internationally, assure and identify each shipment as either: *(1) Tested for Full Functions, R2/Ready for Reuse; (2) Tested for Key Functions, R2/Ready for Resale; and/or (3) Evaluated and Non-Functioning, R2/Ready for Repair*.

(1) Tested and Full Functions, R2/Ready for Reuse[9]

An R2:2013 electronics recycler, prior to shipping equipment and components that contain FMs to an end user, and that will be identified and shipped as Tested for Full Functions, R2 /Ready for Reuse shall:

(A) Use effective test methods to confirm that all functions for equipment and components are working properly and ready for reuse, including properly configured with appropriate legally licensed software where required for operation of equipment and components, and device specific drivers within the product's hardware, and
(B) Implement a written Quality Assurance Plan and policy (or maintain current certification to ISO 9001 or RIOS) to verify the accuracy of test methods, testing equipment (e.g., calibration) and maintain records of effective testing methods, equipment and results, and
(C) Implement a written Product Return Plan and policy appropriate for the final destination of the equipment and components, and
(D) Ensure that all equipment and components are clean and free of major cosmetic defects, as defined in Section (c)(1)(B), and
(E) Ensure that the equipment or components meet the requirements of the recipient.

[9]Tested, fully functioning used equipment that is "out-of-the-box" ready for use by end-users.

(2) Tested for Key Functions, R2/Ready for Resale[10]

An R2:2013 electronics recycler, prior to shipping equipment and components that contain FMs to a recipient vendor or end user, and that will be identified and shipped as Tested for Key Functions, R2/Ready for Resale shall:

(A) Use effective test methods and testing equipment to confirm that the Key Functions of the equipment or components are working properly, and
(B) Implement a written Quality Assurance Plan and policy (or maintain current certification to ISO 9001 or RIOS) to verify the accuracy of test methods and testing equipment (e.g., calibration), and maintain records of effective testing methods, equipment and results as appropriate, and
(C) Disclose in writing to buyers any functions that are not working properly and provide a description of cosmetic defects and missing components for each shipment as applicable, and
(D) Implement a written Product Return Plan and policy appropriate for the final destination of the equipment and components, and
(E) Ensure that the equipment or components meet the specifications of the recipient vendor or the end user.

(3) Evaluated and Non-Functioning, R2/Ready for Repair[11]

An R2:2013 electronics recycler, prior to shipping equipment and components that contain FMs to a recipient vendor, and that will be identified and shipped as Evaluated and Non-Functioning, R2/Ready for Repair shall:

(A) Implement a written Quality Assurance Plan and policy to evaluate equipment and components to ensure the condition, functionality, and sales price of the unit or component is capable of repair and refurbishment in the destination market, and
(B) Confirm through an appropriate combination of contractual agreements, detailed materials tracking, recordkeeping, and auditing that equipment and components containing FMs are only shipped to:
    (i) Electronics recycler(s) that are certified to R2:2013 and verified in accordance with Provision 5(g), or
    (ii) Recipient vendor(s) that can assure that all equipment and components shall be resold in conformance with Section (c)(1), R2/Ready for Reuse or Section (c)(2), R2/Ready for Resale, and
    (iii) Recipient vendor(s) that can manage all equipment and components containing FMs and residual FMs resulting from repair and refurbishing operations in conformance with Provision 3 and 5,

    and,
(C) Ensure that the equipment or components meet the specifications of the recipient vendor.

[10] Tested to assure that key functions are working and that non-functioning attributes are clearly documented for customers.
[11] Evaluated to assure that equipment is repairable for key functions and suitable for its intended market.

(d) An R2:2013 electronics recycler need not conform to Section (c) for sales of "Collectible Electronics" and their associated components or "Specialty Electronics" that the R2:2013 electronics recycler does not possess the technical capability to test or repair. Such sales are restricted to 1% of total individual units by quantity sold on a rolling 12 month average. Sales under this provision must include returns at no cost to the buyer.

(1) An R2:2013 electronics recycler shall conform to the legal requirements (including export) in Provision 3 for these sales/shipments.

(2) An R2:2013 electronics recycler need not conform to the downstream requirements of Provision 5 for these sales/shipments.

(e) An R2:2013 electronics recycler need not conform to the downstream requirements of Provision 5 and the exporting requirements of Provision 3 for shipments that are Tested/Full Function, R2:2013/Ready for Reuse in Section (c)(1), or Tested/Key Functions, R2:2013/Ready for Resale in Section (c)(2), or are new and in original packaging.

7. **Tracking Throughput**

General Principle – *An R2:2013 electronics recycler shall maintain business records sufficient to document the flow of equipment, components, and materials that pass through its facility.*

Requirements:

(a) An R2:2013 electronics recycler shall maintain for at least three years commercial contracts, bills of lading, or other commercially-accepted documentation for all transfers of equipment, components, and materials. An R2:2013 electronics recycler does not need to track non-FMs beyond the first tier downstream vendor.

(b) An R2:2013 electronics recycler shall provide, to each customer that is R2 certified or in the process of R2:2013 certification, upon request and with appropriate intellectual property and commercial controls as legally appropriate and required by the discloser, the names and locations of all downstream vendors in the recycling chain that handle said customer's FMs.

8. **Data Destruction**

General Principle – *An R2:2013 electronics recycler shall be responsible for data destruction of all media it handles using generally-accepted data destruction procedures.*

Requirements:

(a) An R2:2013 electronics recycler shall sanitize, purge, or destroy data on hard drives and other data storage devices (the National Institute of Standards and Technology's (NIST's) Guidelines for Media Sanitization – Special Publication 800-88[12] lists categories of devices which need sanitization consideration), unless otherwise requested in writing by the customer. The R2:2013 electronics recycler shall adhere to the data sanitization, purging, or destruction practices described in the NIST Guidelines for Media Sanitization: Special Publication 800-88 (rev. 1) or another current generally-accepted standard[13], or be certified by a generally-accepted certification program.

[12] See current link to NIST Special Publication 800-88 rev.1 at www.sustainableelectronics.org
[13] Examples include National Association for Information Destruction (NAID) and Asset Disposal & Information Security Alliance (ADISA).

(b) An R2:2013 electronics recycler shall document its data destruction procedures and include this documentation as part of its EHSMS.

(c) Employees involved in data destruction shall receive appropriate training on a regular basis and be evaluated for competency in data destruction processing.

(d) Data destruction processes shall be reviewed and validated by an independent party on a periodic basis as defined in the documentation called for in Section (b).

(e) Quality controls shall be documented, implemented, and monitored internally to ensure effectiveness of data sanitization, purging, and destruction techniques.

(f) Security controls that are appropriate to the most sensitive classification of media accepted at the facility shall be documented, implemented and maintained. Security controls shall consider physical security, monitoring, chain-of-custody, and personnel qualifications.

(g) Adequate records of data destruction shall be maintained by the R2:2013 electronics recycler and each downstream vendor conducting data destruction.

(h) If data destruction is handled by a downstream vendor:

(1) The R2:2013 electronics recycler shall maintain responsibility for data destruction and ensure appropriate security, controls, and processing techniques continue to conform to Provision 8 through audits or other similarly effective means.

(2) Media or devices containing media with data must be tracked and secured during transportation, storage, and processing.

(3) Each downstream vendor must adhere to the requirements of Provision 8.

9. **Storage**

General Principle – *An R2:2013 electronics recycler shall store items and materials that may cause risk to worker health and safety or the environment if inappropriately stored, and equipment and components going to reuse, in a legal and appropriate manner.*

Requirements:

(a) An R2:2013 electronics recycler shall store items removed pursuant to Provision 5, and equipment and components destined for reuse, in a manner that:

(1) Protects them from reasonably foreseeable adverse atmospheric conditions and floods and, as warranted, includes a catchment system, and

(2) Is in full legal compliance, and

(3) Is secure from unauthorized access, and

(4) Is in clearly labeled containers and/or storage areas.

10. **Security**

General Principle – *An R2:2013 electronics recycler shall employ security measures appropriate for the equipment it handles and customers it serves.*

Requirements:

(a) An R2:2013 electronics recycler shall maintain a security program that controls access to all or parts of the facility in a manner and to a degree appropriate given the type of equipment handled, sensitivity of media containing data, and the needs of the customers served.

(b) An R2:2013 electronics recycler shall consider and include necessary controls to secure electronic equipment upon acceptance of said equipment.

11. **Insurance, Closure Plan, and Financial Responsibility**

General Principle – *An R2:2013 electronics recycler shall possess insurance that is adequate to cover the potential risks and liabilities associated with the nature and size of the facility's operations, and shall have adequate legal and financial assurances in place for the proper closure of its facility.*

Requirements:

(a) The R2:2013 electronics recycler shall be able to demonstrate that it has evaluated the risks arising from its certification activities and that it has adequate insurance or reserves to cover liabilities, including environmental pollution and worker health and safety, arising from its operations in each of its fields of activities and the geographic areas in which it operates.

(b) An R2:2013 electronics recycler shall develop and maintain a current, written plan and a sufficient financial instrument that assures proper closure of the facility and assures against abandonment of any electronic equipment, and components and materials from such equipment.

(1) Financial instruments must be assigned to an independent party or corporate parent with responsibility for closure, and the assignment must be consistent with applicable law, and

(2) Financial instruments shall consider the risks identified in Section (a) and applicable law, including reasonably foreseeable costs of processing remaining inventory, sampling for environmental contamination, and site remediation to restore premise to sellable condition, and

(3) Closure plans shall consider the risks identified in Section (a) including details assigning responsibility for closure, funding information, and plans for inventory processing, environmental sampling, and site remediation as needed.

12. **Transport**

General Principle – *An R2:2013 electronics recycler shall transport all equipment, components, and materials using entities that have the necessary regulatory authorizations and in a manner protective of security, public health and the environment.*

Requirements:

(a) An R2:2013 electronics recycler must ensure that all equipment, components, and materials to be transported are packaged appropriately in light of the risk they could pose during transportation to public health or the environment and the level of care warranted by its intended use and secured in accordance with Provision 10.

(b) An R2:2013 electronics recycler must verify that its transporters, including its own fleet, have all the necessary regulatory authorizations, maintain adequate insurance coverage consistent with the material and method of transportation, and maintain an acceptable vehicle and driver safety record during the previous 3 years.

13. **Documentation and Recordkeeping**

General Principle – *An R2:2013 electronics recycler shall maintain all the documentation necessary to demonstrate conformance to the R2:2013 Standard.*

Requirements:

(a) An R2:2013 electronics recycler shall have access at the certified facility to documents and records necessary to demonstrate conformity to each requirement of this document.

DEFINITIONS

Accredited Certification Body

An "Accredited Certification Body" is accredited by an International Accreditation Forum member body under the current ISO/IEC Standard 17021.

Collectible Electronics

"Collectible Electronics" includes items that are rare, vintage, and that are no longer manufactured or supported by original manufacturers.

Downstream Vendors

"Downstream vendors" include any entity to which a recycler transfers used or end-of-life electronic equipment, components, or materials including reuse, refurbishing, demanufacturing, processing, materials recovery, energy recovery, incineration, and disposal facilities.

Electronic Equipment

"Electronic equipment", also referred to as "equipment and components", includes computers and peripheral equipment – central processing units (CPU's); monitors; printers; keyboards; scanners; storage devices; servers; networking systems; copiers; fax machines; imaging systems; printing systems; telephones; televisions; video cassette recorders; camcorders; digital cameras; control boxes; stereo systems; compact disc players; radios; cell phones; pagers; personal digital assistants (PDAs); calculators; organizers; and game systems and its accessories. It furthermore includes any types of equipment that are designed primarily to store or convey information electronically, and any accessories to such equipment.

Focus Materials

"Focus Materials", also referred to as "FMs", are materials in end-of-life electronic equipment that warrant greater care during recycling, refurbishing, materials recovery, energy recovery, incineration, and/or disposal due to their toxicity or other potential adverse worker health and safety, public health, or environmental effects that can arise if the materials are managed without appropriate safeguards.

Focus Materials contain:

(1) Polychlorinated biphenyls (PCBs), or
(2) Mercury, or
(3) CRT glass, except for glass with lead content less than 5 parts per million, and clean of phosphors, CRT fines, coatings, and frit, or
(4) Batteries, or
(5) Whole or shredded circuit boards, except for whole and shredded circuit boards that do not contain lead solder, and have undergone safe and effective mechanical processing, or manual dismantling, to remove mercury and batteries.

Equipment, components, or materials (whole or shredded) that have undergone safe and effective mechanical processing or manual dismantling to remove FMs, yet still retain de minimus amounts of FMs, are not subject to the R2:2013 requirements that are triggered by the presence of FMs.

Key Functions

"Key Functions" are the originally-intended functions of a unit of equipment or component, or a subset thereof, that will satisfactorily serve the purpose(s) of someone who will reuse the unit.

Recyclers

"Recyclers" includes, but need not be limited to organizations that perform the following related to electronics:

(1) Collect
(2) Refurbish
(3) Recycle
(4) Resell
(5) Demanufacture
(6) Recover Assets
(7) Broker

As well as leasing companies that engage in these activities.

Recycling Chain

"Recycling Chain" refers to all the downstream vendors that handle end-of-life equipment, components, or materials that have passed through an R2:2013 electronics recycler's facility or control. It includes, but does not extend beyond materials recovery facilities, and conforms to Provision 5(c) or 5(d). For equipment and components that are sold or donated for reuse, it does not extend beyond the entity that conforms to Provision 6 (c) or (d).

Specialty Electronics

"Specialty Electronics" are rare and specialized equipment that is not generally available in retail. For example, medical, diagnostic, laboratory, or other devices, which are customized for a specific purpose.