

Electronics Recycling Certifications

**GEM Network Meeting
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Presented by:

Greeneye Partners

R2 HISTORY



- R2 (Responsible Recycling Practices) was developed in the US by a multi-stakeholder group. It was published in 2008.
- R2 is not an EH&S management system by itself. R2 must be incorporated into a EH&S management system. ISO 14001 and OHSAS 18001, RIOS or an R2 Solutions approved EHSMS are required.

R2 HISTORY



Development:

- Multi stakeholder group
- E-recyclers and E-refurbishers
- Industry Organizations Including ISRI
- Environmental Organizations
- Electronics Manufacturers
- EPA and US State environmental organizations

Standard Published in 2008 updated in 2013.

R2:2013 Practices – 13 Sections



1. Environmental, Health and Safety Management System
2. Reuse, Recover ... Hierarchy of Responsible Management Strategies
3. Legal Requirements
4. On-Site Environment, Health and Safety
5. R2 Focus Material
6. Reusable Equipment and Components
7. Tracking Throughput
8. Data Destruction
9. Storage
10. Facility Security
11. Insurance, Closure Plan and Financial Responsibility
12. Transport
13. Recordkeeping

R2 Definitions



FOCUS MATERIALS (FM's)

- (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 phosphor, CRT fines, coatings and frit, or
- (4) Batteries, or
- (5) whole and 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.

E-Stewards History



Developed by the Non Profit Basel Action Network after leaving the R2 Process

- Requires integration of ISO 14001 into the standard
- Requires adherence to the Basel Treaty
- Define all used electronics as hazardous Waste
- Developed with input from Cal-OSHA
- Recyclers and refurbishers
- Manufacturers
- V2 is to be published September 2013

E-Stewards Standard



11 Sections:

1. ISO 14001 (has 16 main clauses)
2. Health and Safety in the Workplace
3. Reuse and Refurbishment of Electronics Equipment
4. Data Security
5. Managing Hazardous E-waste and Problematic Components
6. Accountability for Downstream Recycling Chain
7. Material recovery and Final Disposition
8. Exportation of Hazardous Waste
9. Site Closure Plan
10. Insurance
11. Mass balance Accounting and Central Database reporting

e-Steward Definitions



Hazardous e-Waste (HEW) is defined as:

- Circuit boards
- Mercury Containing devices
- CRT glass
- Batteries
- Polychlorinated biphenyls (PCB's in the US)

MANAGEMENT SYSTEMS



Both standards require a certified environmental, health and safety management system.

For many recyclers this is the largest change their organization will make.

- e-Stewards V1 requires ISO 14001 with a strong health and safety component
- R2:2013 requires ISO 14001, 18001 or RIOS

EH&S MANAGEMENT SYSTEM



- An EH&S management system integrates the environmental management system (EMS) and the Occupational Health & Safety management system (OHS) into one – EH&S management system.

ENVIRONMENTAL ASPECTS



- In an EHSMS what affects the Environment, is called Aspects.
- An Environmental Aspect is defined as;

An element of an organization's activities, products, or services that can interact with the environment.

ENVIRONMENTAL ASPECTS



- An Environmental Aspect can be;
 - Dust from a Shredder
 - Noise from equipment
 - Waste water from a cleaning floors
 - Stormwater
 - Natural Resource Use – Electricity, Natural Gas, Water
 - Waste from a process (packaging, wood)

ASPECTS - SHREDDERS



- Dust
- Noise
- Potential for Fire
- Generation of Hazardous Waste (Baghouse filters and dust)

ASPECTS - CRT DISMANTLING



- Potential for Lead dust emissions
- Generation of a hazardous waste (CRT fines)
- The environmental impact is degradation of air, water and soil

ASPECTS - STORMWATER



- Stormwater may come into contact with hazardous materials
- The environmental impact is possible degradation of water and soil quality

ASEPCTS – FIRE



- Air Emissions from a fire
- Disposal of burnt materials
- The environmental impact is possible degradation of air and soil quality

HAZARDS



- An OH&S Hazard can be;
 - Inhalation of Dust from a Shredder
 - Noise from equipment
 - Potential for cuts from handling glass or other sharp objects
 - Potential for injury from moving forklifts or equipment
 - Potential for injury from electricity

HAZARDS AND RISKS



- **Hazards** and **Risks** must be managed with Operational Controls
 - Programs (Injury and Illness Prevention Program)
 - Training (Emergency Drills)
 - Signs (Exit Signs, Warning Signs)
 - Engineering Controls (dust collection system, hoods)
 - Personal Protective Equipment (gloves, hard hats)
 - Emergency Equipment (fire extinguishers, sprinklers)

HAZARDS - SHREDDERS



- Dust
- Noise
- Machine Guarding
- Electricity (Hazardous Energy)
- Confined Spaces
- Cuts from shredded material

HAZARDS - FORKLIFTS



- Carbon monoxide emissions
- Workers/visitors being hit by a forklift
- Forklift tipping over
- Objects falling from forklifts onto workers/visitors

HAZARDS – SHARP OBJECTS



- Cuts from glass
- Cuts from dismantling electronics
- Cuts from sharp edges of equipment

HAZARDS – FIRE



- Death
- Inhalation of Smoke
- Fire from Battery Storage
- Shredder fires from Toner
- Fire from welding activities

Downstream Due Diligence



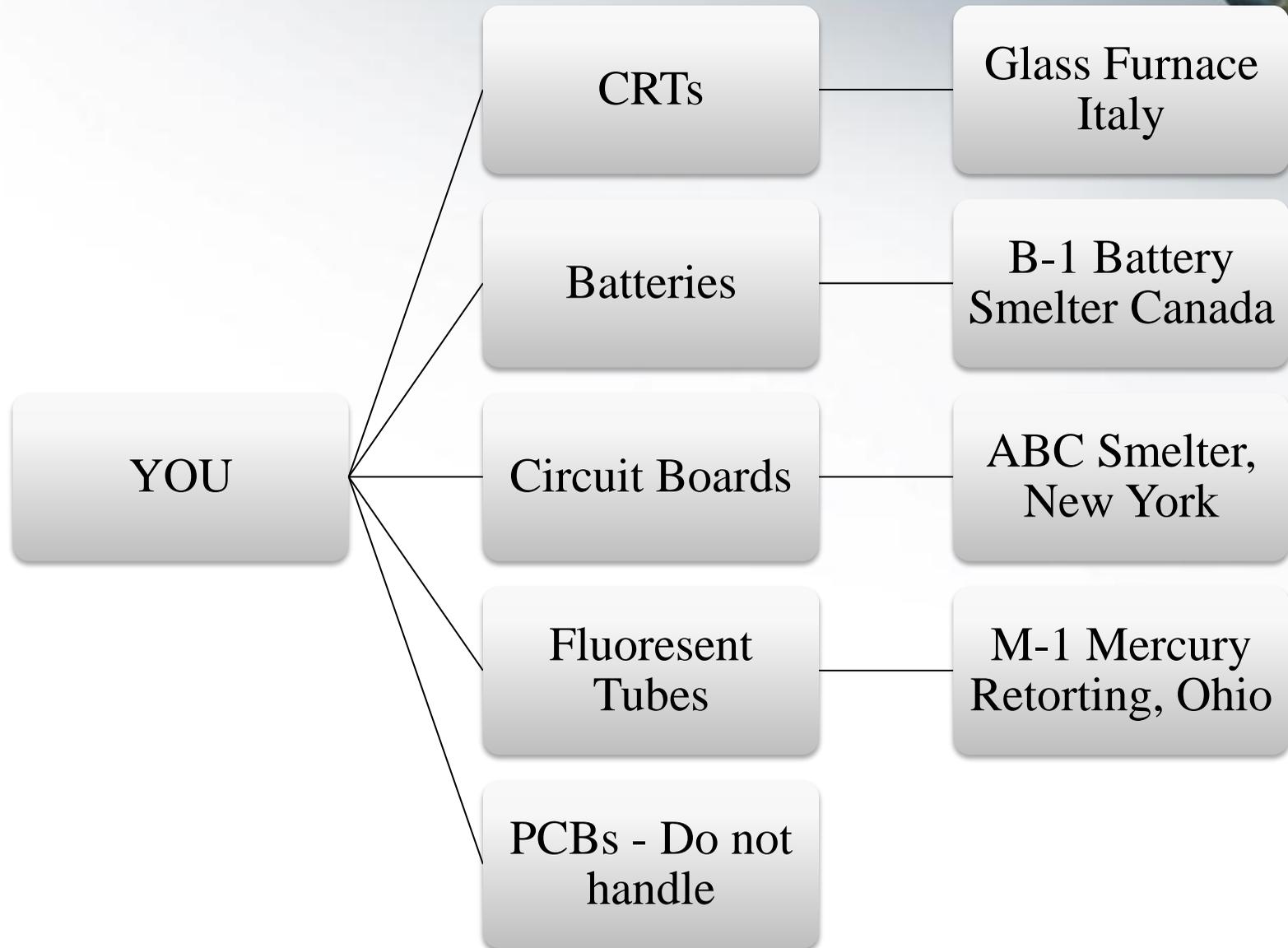
- Downstream Due Diligence is the process of evaluating a prospective downstream vendor by getting information about their;
 - Company background,
 - Processing and technologies used,
 - EH&S licenses and permits,
 - Further Downstreams, including exports

Which vendors require Due Diligence?

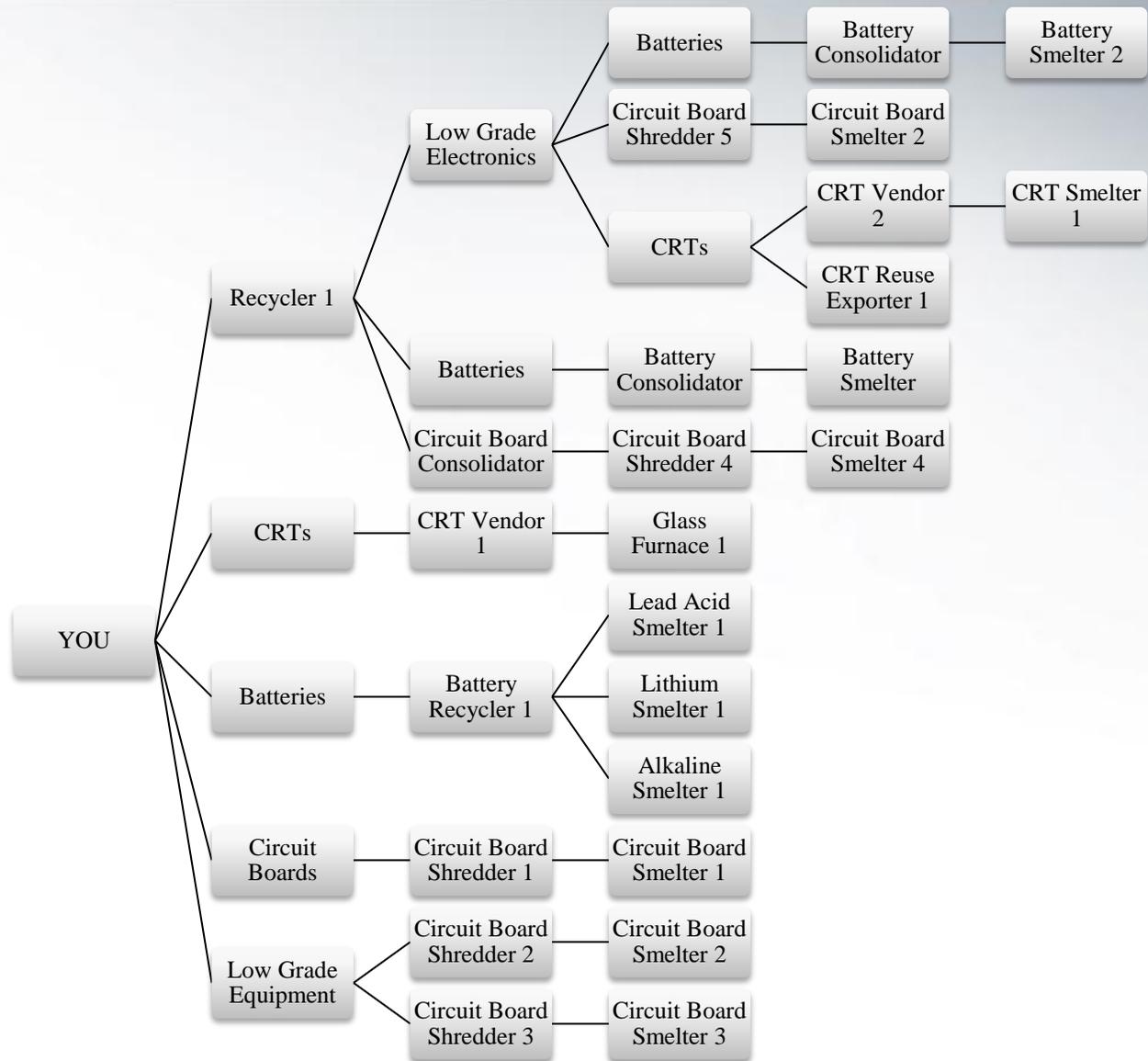


- Due diligence is required on all downstreams handling e-Stewards Hazardous Electronics Waste and R2 Focus Materials.
 - CRT vendors (Monitors, TVs, equipment)
 - Battery vendors
 - Mercury Containing Device vendors (switches/relays, bulbs, laptops, LCD displays, TVs)
 - PCBs vendors
 - Circuit Board vendors
 - This includes materials such as keyboards, mice, cell phones, power supplies, etc. that contain a circuit board.

Material Flow Chart - Simple



Material Flow Chart - Realistic



Implementation



- Choose and train an in house person to manage the process
- Create a project timeline. (avg. 6 – 9 months)
- Decide whether a consultant would be appropriate to help.
- Be prepared to be transparent about all downstream vendors.
- Contact vendors, complete vendor facility information forms and schedule audits.
- Contact transporters and collect transporter data.

Implementation



- Train employees – general awareness training about procedure specific training.
- Schedule the certification body audit – begin the interview and quote process early as it takes time to schedule audits.
- Conduct an Internal Audit – if you decide to conduct your own internal audit, send employees to Internal Auditor Training.

Implementation



- Conduct an Legal Compliance Evaluation – may need outside help.
- Start early with downstream vendors and transporter documentation.
- Provide the necessary resources. Send employees for training and get help when needed.
- Hire a consultant if needed can be \$5700. to \$10,000 USD depending on size of the facility.

Certification



- Stage One audit – onsite review of documentation
- Stage Two audit – onsite full scale operational audit

Kelley Keogh
Greeneye Partners
707-843-1632

kelley@greeneyepartners.com
www.greeneyepartners.com

