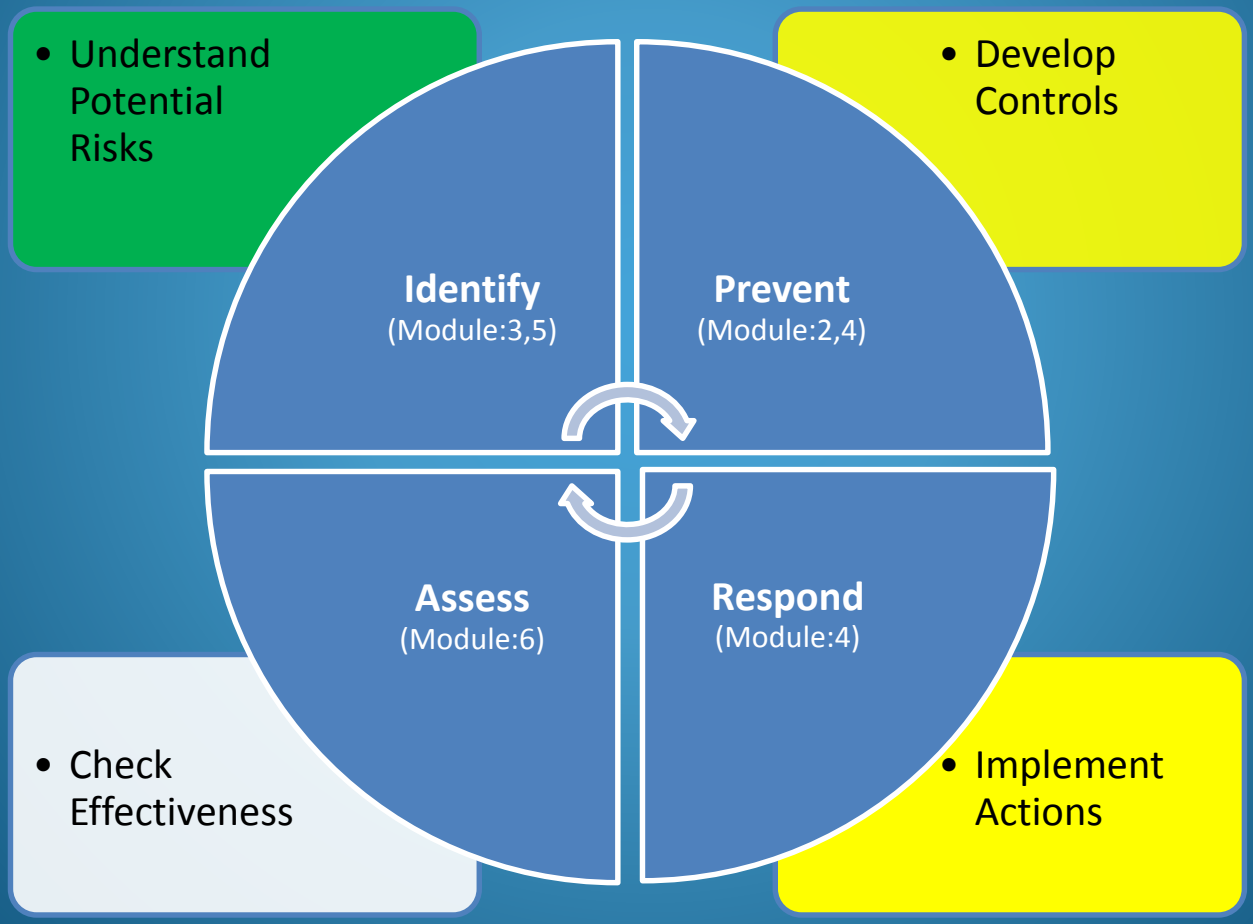
Module 4
Risk Prevention and Minimization

Best Practices for Achieving Environmental Sound Management

at Facilities that Refurbish and Recycle Used and End of Life Electronic Products

ESM Framework

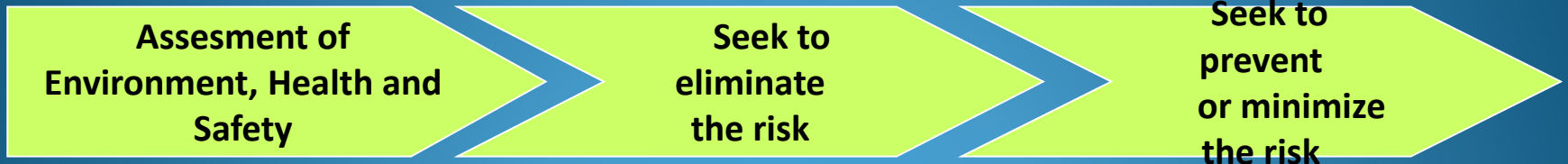
Where Module 4: Prevention and Minimization fits within the framework of ESM.



Why is Risk Prevention and Minimization Important?

- Risk prevention and minimization controls allow to:
  - Raise awareness about hazards and how to mitigate risks.
  - Contributes to safer work practices and compliance with environmental issues.
  - Improve worker competency (risk management training).
  - Enhance facility's safety record.
  - Improve relations with the government and public.
  - Reduce the likelihood of fines and penalties.
  - Demonstrate credibility to government regulators, insurance agencies, financial institutions, and business partners.
  - Improve management response to emergencies related to health and release of chemicals
  - Support ESM.

Controls Used to Eliminate, Prevent and Minimize Risks



EHS risks can be prevented and minimized using the following **controls:**

Engineering Controls: are physically placed at the source of the contaminant to eliminate, prevent or minimize hazards.

Administrative Controls: policies and procedures for pollution control and health and safety

Personal Protective Equipment (PPE): protects workers by minimizing their exposure to hazardous constituents.

LEAD (Pb)

Administrative Control:

Specific training procedures for workers handling leaded equipment

Engineering Control:

Use of enclosed system to open up Cathode Ray Tubes

PPE Control:

Use of appropriate equipment such as gloves, full body smock, and ventilator

Multiple Controls to achieve highest likelihood of preventing EHS risks.

Engineering Controls

- **Engineering Controls**: Controls physically placed at the possible points where exposure to the contaminant could occur to humans or the environment to eliminate, prevent or minimize hazards.
- **They include:** material/product substitution, use of enclosed venting systems, dust capture filters, scrubbers, physical sorting systems.
- Engineering controls into various phases of a facility operations:
  - Receiving, Testing, Sorting
  - Manual Processing
  - Mechanical Processing
  - Packaging, Labelling, Holding
  - Materials Management and Secondary Processing
  - Storage

Handout on best practices

Exhibit 4: Best Practices at the Recycling/Refurbishment Stage

Best Practice Identified—Summary (details follow on next pages)	Recycling or Refurbishment Stage		
	Manual Processing: Disassembly and/or Repair	Mechanical Processing (Recycling)	Management of Processed and Waste Materials
Removal of hazardous components prior to mechanical processing, using specialized tools if authorized to do so.	√		
Conduct all repair work indoors. Utilize ventilation and filtration equipment, where appropriate, for manual processing.	√		
Use proper ventilation to collect solvent fumes during cleaning.	√		
Technically capable to use the equipment they have, and should have an emissions management program for the specified equipment.		√	
Perform all mechanical processing indoors. Put in place engineering controls in order of recommended priority: isolation, ventilation, control and capture, emergency shut-off, and fire suppression.		√	

Engineering Controls:

Best Practice in Receiving

- During receiving, testing and sorting, refurbishment operations should carefully handle delicate hardware, such as laptop screens, flat panel monitors and other display equipment, to ensure that reuse or refurbishment options remain viable.

Engineering Controls:

Best Practice in Testing

- To determine the suitability of used equipment for reuse, facilities should test the functionality of its key components and evaluate whether the equipment contains hazardous substances. A visual inspection without testing functionality is unlikely to be sufficient.

REUSE
REDUCE
RECYCLE

Engineering Controls:

Best Practices in Disassembly

- Well equipped and trained facilities shall:
  - Physically remove potentially hazardous components from electronics prior to conducting mechanical processing
  - Use appropriate tools and care to preserve the value of reusable components
- If not properly equipped or trained to handle certain hazardous substances, they must redirect the entire product to specialized facilities

Engineering Controls:

Manual Processing - Disassembly

- Hazardous components to remove:
  - Mercury containing components (e.g. batteries, lamps, switches)
  - Cathode Ray Tubes (CRTs) (reduction? potential handling problem?)
  - Batteries, including Nickel-cadmium, Lead-acid, Lithium-ion
  - Toners, inks, ink cartridges (specific handling actions of HP)
  - Photoreceptive drums containing selenium/arsenic in printers and copiers
  - Components containing PCBs such as older transformers
  - Radioactive materials found in smoke detectors for example
  - Glycolant-based coolants (e.g. in rear-projection CRT display devices)

<u>What items or types of products is the facility willing to accept?</u>

Engineering Controls:

Best Practices – Manual Processing Repair

- Some repair and refurbishment operations contribute to air emissions (soldering circuit boards, solvents in equipment cleaning) which could harm worker health or the environment if they are not contained.
- When doing repairs:
  - All hazardous non-functional components should be removed
  - Conduct all repair work indoors. Use dust collectors and fume hoods as appropriate to ensure dusts are not ventilated out of doors.
  - Proper ventilation should be assured.

Handout on best practices

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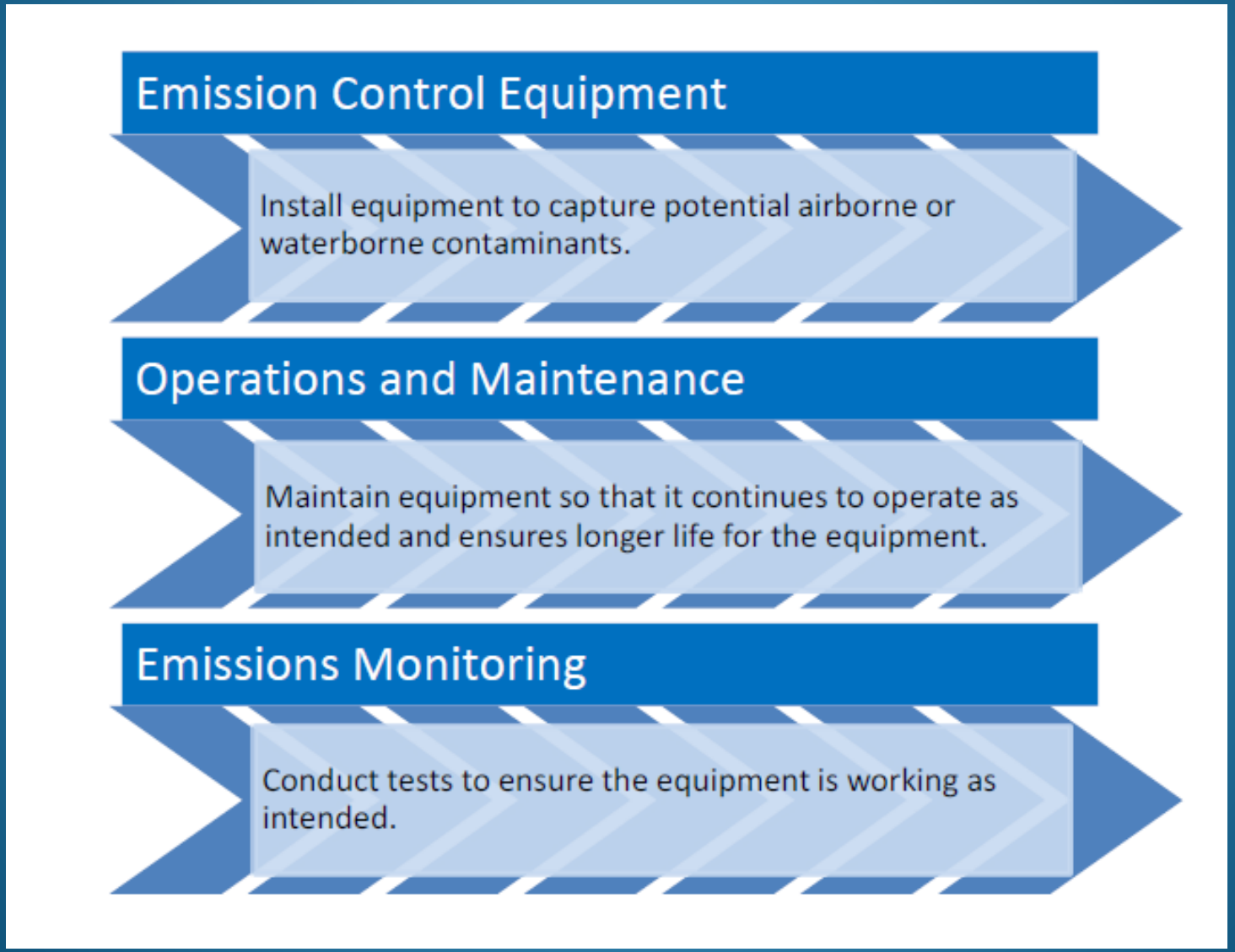
	Manual Processing: Disassembly and/or Repair	Mechanical Processing (Recycling)	Management of Processed and Waste Materials
[illegible]	√		
Technically capable to use the equipment they have, and should have an emissions management program for the specified equipment.		√	
Perform all mechanical processing indoors. Put in place engineering controls in order of recommended priority: isolation, ventilation, control and capture, emergency shut-off, and fire suppression.		√	
Perform regular maintenance on all emission control equipment. Develop preventive maintenance programs.		√	
Conduct monitoring for hazardous substances on: indoor ambient air; surfaces. And monitor water discharges for hazardous substances.		√	
Process all hazardous materials that have been generated, removed or recovered from primary processing at authorized facilities.			√

Engineering Controls:

Best Practices – Mechanical Processing

- Facilities that undertake mechanical processing should have adequate **fire suppression equipment**.
  - Watch out operation: grinding and shredding
- Facilities should be technically capable to use the equipment they have installed, and should have an **emissions management program** for the specified equipment.

Emissions Management Program



Engineering Controls:

Best Practices - Emission Control Equipment

- Emission **controls** while performing mechanical processing should be in place in each area of the facilities.

1. Substitution (e.g., replacing a toxic solvent with one less toxic)
2. Isolation (e.g., automating and isolating a process to avoid employee exposure)
3. Ventilation and capture (e.g., a negative pressure enclosure or fume hood)
4. Control, capture, and clean up (of dust filters, or of spills through non-pervious flooring)
5. Emergency shut-off systems, and
6. Fire suppression systems.

Engineering Controls:

Best Practices - Operations and Maintenance

- Performing regular maintenance on all emission control equipment.
  - Preventative maintenance programs
  - Routine, preventive, scheduled and unscheduled actions to prevent equipment failure with the goal of increasing efficiency, reliability, and safety.
  - For all ventilation systems, tasks should include airflow testing, ductwork inspections and filter replacements.

Engineering Controls:

Best Practices - Emission Monitoring

- Conduct:
  - Monitoring for mercury and mercury compounds.
  - Tests for hazardous substances such as inhalable hydrocarbons, bromated flame retardants, and mercury, lead, beryllium, and cadmium compounds.
  - Tests for inhalable acids or solvents.
  - Semi-annual air testing for silica dust, lead, beryllium, and cadmium.
  - Taking wipe samples from processing areas and testing for heavy metals. (wipe samples from common areas as lunch).
  - Tests either validate existing practices, or suggest the need for new controls

Callifornia Department of T S C

Emissions control example in California Department of Toxic Substances Control

The emphasis of the HSP activities was to ensure the safety of DTSC staff at the Site from physical and chemical hazards. Real-time monitoring was conducted for airborne particulates and ionizing radiation hazards. Air sampling was also conducted for airborne metal particulates for laboratory analysis.

8/30/11 Time	LOCATION	INSTRUMENT	READING
11:10	In parking lot outside facility	pDR	Conc.= 0.029 mg/m^3 TWA= 0.073 mg/ m^3 (action level = 0.123 mg/m^3 TWA)
		GammaRAE II	7 µR/hr (within normal ambient range)
11:30	Indoor dismantling / storage warehouse	pDR	Conc.= 0.012-0.141 mg/m^3 TWA= 0.061 mg/ m^3
		GammaRAE II	5 µR/hr
11:37	CRT dismantling & phosphor removal area	pDR	Conc.= 0.400 mg/m^3 TWA= 0.080 mg/ m^3
11:45	Next to yoke separating machine	pDR	Conc.= 0.107 mg/m^3 TWA= 0.093 mg/ m^3
12:10	Indoor storage area	pDR	Conc.= 0.043 mg/m^3 TWA= 0.090 mg/ m^3
		GammaRAE II	5 µR/hr

Handout on best practices

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Best Practice Identified—Summary (details follow on next pages)	Recycling or Refurbishment Stage		
	Manual Processing: Disassembly and/or Repair	Mechanical Processing (Recycling)	Management of Processed and Waste Materials
surfaces. And monitor water discharges for hazardous substances.		√	
Process all hazardous materials that have been generated, removed or recovered from primary processing at authorized facilities.			√
Seal, label, and transport removed mercury-containing devices to licensed facilities.			√
Printed circuit boards with lead-based solder should be smelted in an integrated copper smelter.			√
When packaging for transport, make sure to seal containers holding CRTs, CRT cullet/glass, or equipment containing CRT glass.			√
Manage toner and ink printer cartridges in a manner that minimizes dispersal of toner and inks.			√
Ensure to bag dusts, residues, sweeps and slag from all facility air control cleaning and maintenance operations.			√
Dispose of polychlorinated biphenyl (PCB)–containing components or PCB-contaminated material properly at a designated facility.			√
Plastics and resin materials should be disposed of in a manner that is consistent with applicable Basel technical guidelines.			√
Remove batteries prior to processing. Insulate, sort and store them to protect against short-circuiting; send to authorized recyclers.			√
Apply the waste management hierarchy, in management decisions regarding final material disposition for end-of-life electronic products.			√

Engineering Controls

Best Practices - Packaging

- Ensure that packaging minimizes risks during movement such For example:
  - Protect each piece of computing equipment with appropriate cushioning.
  - Pack cables, keyboards and mice in separate boxes.
  - Separate stacked layers of computing equipment with packaging (e.g., cardboard, bubble-wrap)
  - Individually package LCD backlights in a rigid container and seal in a foil laminated bag.

Engineering Controls

Best Practices - Labelling

- Put in place detailed labels on the exterior of all packaging destined for further refurbishment, reuse or recycling.
- Including:
  - Type of component, device or equipment and identification number, manufacture/brand (if known), information if applicable for hazardous product residuals, tests information (in case of reuse or refurbishment)

Engineering Controls

Best Practices - Holding / Storage

- Recommended local, provincial, state, or national legal requirements.
- Ensure all material is protected from the elements,
- Facility with protection against accidental spills, is secure, is clearly labelled.
- Watch out for potential liquids or leachable compounds
- Hazardous waste should not be stored for more than the period allowed in your jurisdiction, and should be inventories.
- Secure facilities as sometimes tend to be stolen for components with high value.

Does this follow ESM?

Washington State Department of Ecology

Example: E-Waste, LLC

Site visit showed improper storage of material.

Engineering Controls

Best Practices – Hazardous Waste

- Process all hazardous materials that have been generated or recovered in licensed facilities.
- ***Mercury:*** Seal, label and transport removed mercury containing devices according to regulations.
  - Protect fragile mercury-containing components from breakage (e.g. LCD backlighting, mercury lamps and tubes).

Engineering Controls

Best Practices – Hazardous Waste

- ***Lead:*** Printed circuit boards with leaded solders should be smelted in an integrated metal smelter
- When packaging for transport, make sure to seal containers with CRTs, CRT cullet/glass, or equipment containing CRT glass.

Mixing hazardous waste

Non Hazardous + Hazardous = Hazardous

Engineering Controls

Best Practices – Hazardous Waste

- ***Toner and Inks:*** containing selenium (printer drums), should be removed (not shredded) and sent to a licensed facility.
- Minimize dispersal of toner and inks to reduce exposure.
    1. Prefer refill or reuse cartridges, refurbish or remanufacture where feasible.
    2. Remove colour inks and toners and dispose of these in hazardous waste landfills. Black toners coul remain in cartridges and be disposed of in a solid waste landfill.
- ***Polychlorinated biphenyl (PCB):***
    - Destroyed in accordance with *the Stockholm Convention on POPs* utilizing de-chlorination OR high temperature incineration utilizing pollution prevention. PCB-containing devices must not be dismantled to expose its contents, refurbished or recycled.

Engineering Controls

Best Practices – Hazardous Waste

- ***Collections from air controls:*** Bag dusts, residues, sweeps and slag from all facility operations.
  - Collected dust and residues should be sealed, packaged and managed as hazardous wastes at authorized facilities, especially those designed to control heavy metal and other hazardous airborne particulates.

- ***Plastics and Resins:*** Find an alternative to a solid waste incinerator for plastics and resin materials containing Bromated Flame Retardants (BFR)s or Poly Vinyl Chloride (PVCs).

Engineering Controls

Best Practices – Batteries

- ***Batteries:***
  - Manually remove them.
  - Establish management processes to avoid short circuits and current flows. E.g., packing Li-ion batteries in vermiculite; bagging corroding or leaking batteries; taping battery terminals to prevent short circuiting; and lining the inside of metal drums with plastic.
  - Avoid large inventories of batteries in storage; transport them to authorized battery refurbishing or recycling facilities.

Remember for final material disposition to apply the Waste Management Hierarchy

Handout - Recommended Best Practices for End-of-life Batteries

Type	Where Found	Toxic Content	Minimum Processing	Best Practice
Lithium-ion	Laptops, cell phones, personal digital assistant devices	Phosphate, cobalt (heavy metal)	Pyrometallurgical or hydrometallurgical processing	Electric arc furnace. Soft-chemical solvent-free process in the future.
Lithium metal / Lithium primary	Button cell, coin cell batteries	Lithium perchlorate, mercury	Hydrometallurgical processing	Hydrometallurgical processing. Soft-chemical solvent-free process in the future.
Lead acid	Universal power system, back-up.	Lead	Mechanical + smelt processing	Mechanical + smelt processing
Alkaline-cell	Digital cameras	Manganese, potassium hydroxide	Collection for decommissioning. Disposal in permitted, lined and leachate-controlled landfills or hazardous waste landfills.	Disposal in permitted, lined and leachate-controlled landfills or hazardous waste landfills. Soft-chemical solvent-free process in the future.
Nickel-metal hydride	Older cell phones, laptops	Nickel (heavy metal), potassium hydroxide	Recycling using stainless steel. Disposal of residuals in hazardous waste landfill.	Steel mill processing. Soft-chemical solvent-free process in the future.
Nickel-cadmium (Ni-cad)	Electric tools, shavers, cordless phones	Nickel, cadmium (heavy metals), potassium hydroxide	Recycling, cadmium recovery specialist. Retort furnace. Disposal residuals in hazardous waste landfill.	Cadmium retort furnace

Battery processing can go wrong

Administrative Controls

- **Administrative Controls**: policies and procedures that outline rules, responsibilities and methods for pollution control and health and safety.
- Appropriate for their needs, size, and scale of operations.

• Policies and Procedures for Sorting Incoming Products
• Injury and Illness Prevention Program
• Health and Safety Committee
• Environment, Health and Safety (EHS) Management System

Administrative Controls

Best Practice – EHS Planning

- An organization's EHS system should:
  - Identify environmental and worker health/safety impacts or hazards
  - Establish environmental goals, objectives and targets.
  - Plan actions and document procedures that work toward achieving identified goals.
  - Plan for emergency preparedness and response
  - Plan for site closure.
  - Plan for unanticipated events through insurance.

Washington State Department of Ecology

Processor's Annual Audit

- Performed by 3rd party certified by Washington Department of Ecology.
- Must include list of materials of concern and their end of life destination.
- Must include proof of financial assurance for closure.
- Each facility's audit format is different, but must address the 19 performance standards.

E-CYCLE
small effort • big return
ecyclewashington.org

Washington State Department of Ecology

Washington State Preferred Performance Measures for Direct Processor

- Responsible Management Priorities
- Legal Requirement
- EHSMS
- Recordkeeping
- On-site Requirements
- Materials of Concern
- Recycling
- Reuse
- Disposal Requirement
- Refurbishment
- Prison Labor
- Facility Access
- Transport
- Notification of Penalties an Violations
- Due Diligence Downstream
- Exporting
- Insurance
- Closure Plan
- Facility Security

Processor Standards, http://www.ecy.wa.gov/programs/swfa/eproductrecycle/processor.html

Handling of Materials of Concern

EWC Group, 410 Andover Park E, Tukwila, WA 98188				
Materials	**Recycling Process**	**Fate of Recycling Process**	**End-of-life Processing Destination Country**	**End-of-Life Processing Company**
Materials of Concern				
CRT Glass	Manually removed from CEP; separate panels, metals, and all other residuals	Glass to glass; all materials reused in new glass products	U.S. / Mexico / India	CONFIDENTIAL
Circuit Boards	Manually removed from CEP	Primary smelter for precious metal recovery	Hong Kong	CONFIDENTIAL
Batteries	Manually removed from CEP and sorted by type	Metal Recovery	U.S.	CONFIDENTIAL
Mercury Devices	Manually removed from CEP, managed as Universal Waste	Mercury recovery	U.S.	CONFIDENTIAL
Materials of Non-Concern				
Steel	Manually removed from CEP	Metal recovery	U.S.	
Plastics	Manually removed from CEP	Plastic Recovery	China*	
Insulated Wire	Manually removed from CEP	Metal recovery	China* / Korea	
Aluminum	Manually removed from CEP	Metal Recovery	China* / Korea	

* In accordance with the 25th Notice of Ministry of Foreign Trade & Economic Corporation and EPA of China

Common Areas Found in Audit Needing Correction

- Missing labels.
- EHS out of date.
- Need for better employee training.

Handout on administrative controls

Receiving

Testing

Disassembly Repair

Holding

Packaging

Downstream

Exhibit 8: Summary Table of Administrative Control Best Practices

Best Practice Identified—Summary (details follow on next pages)	Type of Administrative Control		
	Policies / Procedures	Committees or Programs	Management System Components
Receiving: Have a documented process for dealing with "non-conforming" equipment that arrives (a "Do Not Accept" list). Redirect components with hazardous substances to authorized facilities.	√		
Receiving: Have documented clean-up procedures for accidental breakage of hazardous equipment posted in the receiving area.	√		
Testing: To determine the suitability of used equipment for reuse, test the functionality of key components and record results.	√		
Testing: Always adhere to international electrical safety test guidelines when testing for electrical safety.	√		
Disassembly/Repair: Have documented procedures in place for manual removal, storage and treatment of hazardous components.	√		
Disassembly/Repair: All hazardous components removed should be packaged, stored and transported as hazardous, in compliance with all local, state/provincial, federal/national regulations.	√		
Holding: Ensure all material is securely stored in a manner that meets all applicable legal requirements, including maximum allowable time periods for material retention and storage.	√		
Holding: Keep inventories of stored hazardous substances, to ensure conformity with regulatory requirements and to support implementation of facility emergency response plans.	√		
Packaging: Packaging must minimize potential breakage and risks to human health and the environment during movement. Basel Convention guidelines should be followed.	√		
Labelling: Containers should be labelled in a clear, legible, visible and durable manner, and meet applicable legal requirements. Labels should convey essential information to facilitate proper handling.	√		
Downstream: When selecting downstream processors, establish and maintain a documented process, to assess and evaluate their ability to handle products and materials from your facility in a safe and environmentally sound manner.	√		
Downstream: Ensure that used products and components that are shipped for reuse will actually be directed for reuse (versus recycling or final disposal). Ship used products and components for reuse in separate packaging from non-reusable items, obtain verification of safe arrival, and maintain detailed documentation.	√		
Committees: Develop an injury and illness prevention program (IIPP).		√	

Administrative Controls

Best Practices – Receiving (incoming products)

- Accept only designated electronics and establish procedure in place for rejecting unwanted equipment.

Administrative Controls

Best Practices – Visual Sort & Functionality Testing

To determine the suitability of used equipment for reuse, workers should test the functionality of its key components. Results of testing should be recorded. Look out for electric safety when testing

Send for recycling after visual inspection if:

- **Damage**
- **Wear and Tear**
- **Age**
- **Missing or inadequate parts**

Cosmetic damage and minor blemishes may be acceptable depending upon equipment type and the intended market.

Administrative Controls

Best Practice – Spill Response and Clean Up

Refrigerants in a household dismantling facility

- Documented clean-up procedures for accidental breakage of hazardous equipment like:
  - Fluorescent tubes, backlighting for LCD screens, thermostats, CRTs, **leaking batteries or printing cartridges**.

Administrative Controls

Best Practice – Emergency response

- The emergency response procedures should include:
  - Definition of responsibilities
  - List of emergency contacts and telephone numbers.
  - Readily available of response resources, such as first aid supplies and spill clean-up materials.
  - Outline the incident internally and, where applicable, to a Stewardship Program and regulatory authorities.
  - Be tested on at least an annual basis and records of the test and response maintained.
  - Review emergency test or actual response as necessary

Administrative Controls

Best Practice – CRT Spill Response and Clean Up

- A CRT Clean-up kit consists of a broom, small plastic liner bags, dust pan, disposable dust mask, and disposable latex gloves.
- If a CRT breaks:
  - Inform and isolate el area
  - Use hand held broom and dustpan to gather broken glass
  - Wipe up any residue with the paper towels.
  - Bring the broken CRT glass in the bucket to a designated disposal area.
  - Replace the used equipment
  - Disposal should follow the local regulations.

Administrative Controls

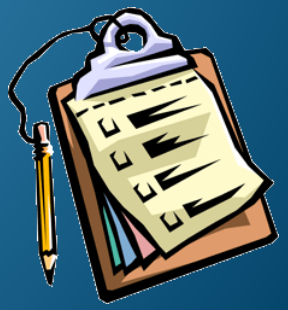
Best Practice – Mercury Spill Response and Clean Up

- If a fluorescent lamp breaks:
  - Inform the foreman / warehouse supervisor
  - Put on Personal Protection Equipment
  - Ventilate the area for at least 15 minutes prior to starting clean-up
  - Do not use a vacuum to clean up the initial breakage, it may contaminate it.
  - Sweep and wipe the area with a disposable wet wipe
  - Place the broken glass and clean-up materials in a container with a tight lid
  - Disposal should follow the local regulations.

Administrative Controls

Best Practice – Injury and Illness Prevention Program

- Check points regarding responsibilities of the Health and Safety Committee :
  - Observe H&S signs, posters, warning signals and directions.
  - Review the building emergency plan.
  - Learn about the potential hazards.
  - Appropriate H&S training.
  - Follow all safe operating procedures and precautions, read operating manuals for equipment.
  - Use proper PPE and regularly inspect it for correct fit and function.
  - Warn coworkers about defective equipment or new hazards.
  - Report unsafe conditions.
  - Participate in workplace safety inspections.



Administrative Controls

Environment, Health and Safety Management System (EHS)

- Remember it's a joint effort:

Administrative Controls

Best Practice – Closure plan (in the event of sale, closure, abandonment, bankruptcy)

- Plan for testing and remediation conduct dust sampling for BFRs, heavy metals, and PAHs.
- The plan should include remediation for contaminated areas, soil and groundwater testing.
- Plan for decommissioning after closure.
- Management plan: to ensure that the material is properly managed in the future
- Proper financial provisioning

Washington State Department of Ecology

Example: EcoTech Recycling, LLC

- Accumulating CRTs and leaded glass.
- Audit incorrectly showed financial assurance for closure. Processor only had pollution liability.
- Mutually agreed to end participation in E-Cycle WA program.

Administrative Controls

Best Practice – EHS Implementation and Operation

- Implement operational procedures
- Implement best practices for engineering controls
- Ensure operational maintenance is performed
- Implement training and awareness programs.
- Insurance contracts

Administrative Controls

Best Practice – EHS Training

- Awareness training

- Competence training

Administrative Controls

Best Practice – EHS Training

- Orientation and annual train workers on IIPP and EHS.
- Consider:
  - Results of the risk assessment; sampling, audits or inspections; worker accident/incident reports; fines or regulatory orders, the effectiveness of previous training.
  - Training requirements each job function.
  - Scheduled and completed before undertaking the tasks.
  - Contractor training should reflect the level of risk of the work.

Administrative Controls

Best Practice – EHS Training

- Ensure stakeholders to have an appropriate level of awareness, competency and training with respect to the effective management of occupational risks.
- Government officers could identify, plan, monitor and record training needs for stakeholders (e.g. requests from companies)
- The companies should have a protocol to train employees at each relevant function and level in proper conditions (no cost, in working hours).
- Design the training with a follow-up.
- Training assessments may include written tests, task observation or worker performance reviews.
- Training may be supplemented with written procedures or instructions.
- Train supervisors about the specific hazards (new and existent) that workers under their immediate supervision may be exposed to.

Administrative Controls

Best Practice – Downstream Processors

- International guidelines – Basel Convention
- National compliance
- Management responsibilities for material after it leaves facilities is ESM
- Recycling Chain of Responsibility
  - Where does material go for further processing?
  - Can you track that it actually is received by the intended facility(s)?
  - Do they practice ESM or have worker health and safety protocols?
- Main concerns:
  - That all material is handled in a safe and environmentally sound manner (e.g. Basel Convention)
  - Manufacturer's brand in a illegal waste dump.

EXAMPLE

National

International

Umicore, Xtrata, etc.

Washington State Department of Ecology

Example: EWC Group

- Verified down stream vendor for CRTs, Dow Management.

- Dow Management abandoned warehouse of CRT glass.

- EWC Group has removed their share from the abandoned site.

Administrative Controls

Best Practice – Reuse Agencies Control

- Verify that material qualifies for reuse
- Packaging and labelling separately from non-reusable items
- Verification of safe arrival, and maintain detailed documentation (as invoice which states that the equipment is for reuse and functional)
- Check the final destination price (reusable equipment is typically priced by unit, whereas recyclable material is priced by weight)
- How the material will be handled at its end-of-life? (e.g. DONATIONS)

Example of refurbishment of computers demand

400 electronics in 4 hours with 1 year warranty and update service

Administrative Controls

Reference tools (EPA)

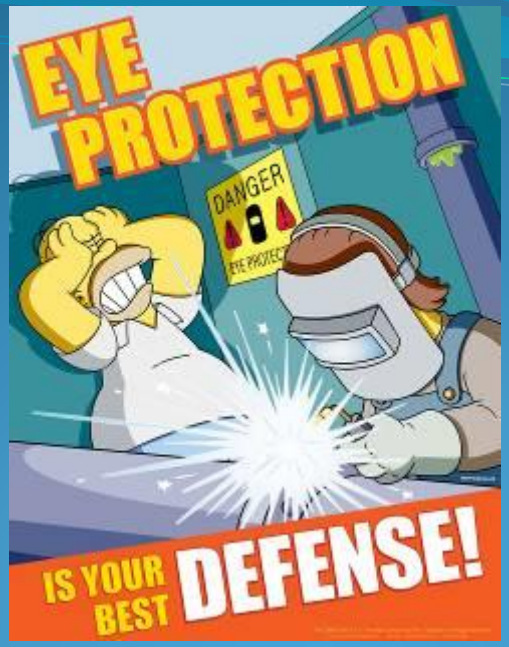
- Checklist for the Selection of an Electronics Recycler EPA website (http://www2.epa.gov/fec/checklist-selection-electronics-recycler-722012)
  - Is the recycler certified? (Y/N)
- Guidelines for On-Site Reviews of Electronics Recyclers (http://www2.epa.gov/sites/production/files/documents/onsite_review.pdf)
  - Are there any areas on the premises that indicate that a major spill, leak or fire may have occurred? (Y/N)
- Best Practices for Conducting an On-Site Review of an Electronics Recycler (http://www2.epa.gov/fec/best-practices-conducting-site-review-electronics-recycler-7232012)
  - Formulate your objectives or criteria for selecting an electronics recycler
  - Develop a team review plan and arrange for the on-site review

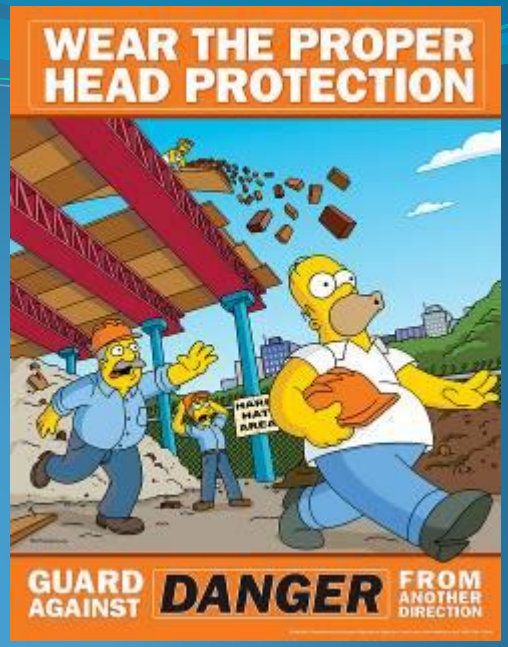
Personal Protective Equipment

- **Personal Protective Equipment**: Protect workers by requiring them use PPE to minimize their exposure to hazardous constituents. This control includes physical equipment to wear as well as personal protective procedures. Usually especific regulations in each country.

Protection is important for eyes, head, hands, skin, feet, hearing, and for the respiratory system


THE RISK IS GREATER
IF YOU WEAR THE WRONG RESPIRATOR


EYE PROTECTION
DANGER
EYE PROTECT
IS YOUR BEST DEFENSE!


WEAR THE PROPER HEAD PROTECTION
GUARD AGAINST DANGER FROM ANOTHER DIRECTION


TO SEE CLEARLY
USE EYE AND FACE PROTECTION AT ALL TIMES


CHECK LABELS ON CHEMICAL CONTAINERS
GET BACK TO WORK!
But it's such a sweet smelling poison.
WARNING DO NOT EAT!
WEAPONS GRADE DEATH SYRUP
TOXIC!
EVERY CHEMICAL CONTAINER MUST HAVE A WARNING LABEL


SLIPS, TRIPS, AND FALLS
CAN BE PREVENTED

Kenya takes on e-waste problem with new recycling hub

March 30, 2014 at 12:00 AM EDT

Used electronics are one of the fastest growing sources of waste globally, and it is estimated that 15,000 tons of used computers and mobile phones are shipped to Kenya every year. Today, Kenya is trying to get ahead of the problem, by building the country's first electronics recycling hub.

EMAIL COMMENTS

MORE VIDEO

Sunday, June 8, 2014

Boko Haram continues spread of violence

Saturday, June 7, 2014

LISTEN 00:00 00:00 SEE PODCASTS

THE RUNDOWN

Personal Protective Equipment

Best Practice – Use PPE

- Use appropriate health and safety precautions during all processes
- Facilities should require the following equipment where applicable:
  - Face shields or protective glasses; hard hats; gloves; uniforms or long-sleeved shirts and pants; clip-on steel toe protectors or steel toe shoes.
  - Noise levels should be controlled according to labour laws, workers also need personal hearing protection.
  - Appropriate personal respiratory protective equipment to avoid being exposed to unexpected releases and process upset conditions.

Personal Protective Equipment

Best Practices: documented and implemented

Receiving

Testing

Disassembly Repair

Personal Protective Equipment

Best Practice

Workers should remove contaminated clothing promptly after they have completed their work

Holding

Shredding

Packaging

Personal Protective Equipment

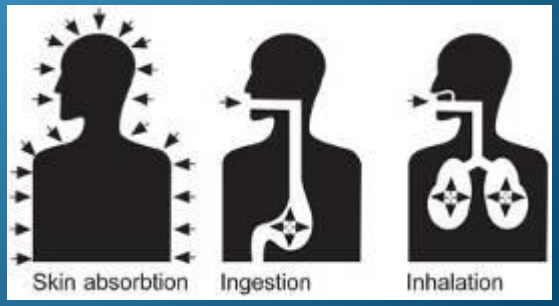
Best Practice

- Management's responsibilities:
  - Implement a program for the proper provision, use and care of PPE.
  - Routine communication and training
  - Inspection program, or possibly a rewards program.
  - Provide necessary PPE for all employees (and visitors); ensure that PPE is appropriate, properly rated, and fit-tested to individual needs; post notices in areas requiring PPE; and enforce the use of necessary PPE.

Personal Protective Equipment

Best Practice

- Monitor worker exposure to hazardous substances on a semi-annual basis as an indicator of both equipment performance and implementation of H&S practices.
  - In shredding area: mercury, lead, beryllium, cadmium, and bromated flame retardants.
  - Have a medical surveillance program in place (e.g. biomonitoring).
  - Baseline information could be collected upon employment start
  - Workers should be entitled to a second medical opinion
  - Identification of key hazard areas and implementation of new occupational safety procedures.



Summary – Key Take Away Messages

- **Risk Prevention and Minimization**: Efforts to reduce risks to the environment, population, workers health and safety

Engineering Controls

Administrative Controls

Personal Protective Equipment (PPE)

- Risk prevention and minimization efforts are not only for managers or workers
- Controls are useful for:
  - ✓ Act upon hazards at the source.
  - ✓ Keep track of materials
  - ✓ Procedures and training operations.
  - ✓ Worker health and safety

Thank you