

Pollution Prevention (P2) Planning For Industrial Environments

Set up a recycling program in your workplace!

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**North Texas
Corporate
Recycling
Association**



www.ntcra.org

ABOUT NTCRA

Mission

The NTCRA exists to promote recycling and the use of recycled goods to area businesses through Leadership, Advocacy and Education.

Activities

- Education:
 - Speakers Bureau
 - Leadership Luncheon
 - Great Eco-Bus Tour
- Mixers / Networking / Golf Tournament
- Recognition:



P2 Planning Agenda

- Legal Requirements
- Key Concepts
- P2 Planning Process
- Implementation Techniques
- Keys to Success

P2 Planning Legal Requirements

Waste Reduction Policy Act (WRPA)

Requires certain facilities to prepare a pollution prevention (P2) plan (30 TAC 335 Subchapter Q)

Toxic Release Inventory (TRI) Form R Reporters

Hazardous Waste Generators

Large Quantity Generators (LQG)

Small Quantity Generators (SQG)

Requires preparation of a 5-year P2 plan and submission of Executive Summary to TCEQ

Annual Progress Report for LQG & TRI reporters

Goal: reduce waste, pollution, cost and liability



P2 Planning

Key Concept

Source Reduction vs. Waste Minimization

Source Reduction – reduce the amount (*e.g.*, don't generate it to begin with)

Waste Minimization – reduce the environmental or health hazard (*e.g.*, reuse, recycle, neutralization, or detoxification)

Order of Preference

1. Reduce
2. Reuse
3. Recycle
4. Neutralize
5. Detoxify
6. Disposal (try to eliminate)





P2 Planning The Process

1. Develop a P2 team

- Cross-functional if possible: environmental, facilities, production, office, enthusiastic employees

2. Identify your pollutants

- Tour your facility
- Perform waste audit
 - “Dumpster Diving”
- Don’t forget about energy, water, air emission, etc.
- Develop list of waste generated
 - Include volume and costs when available

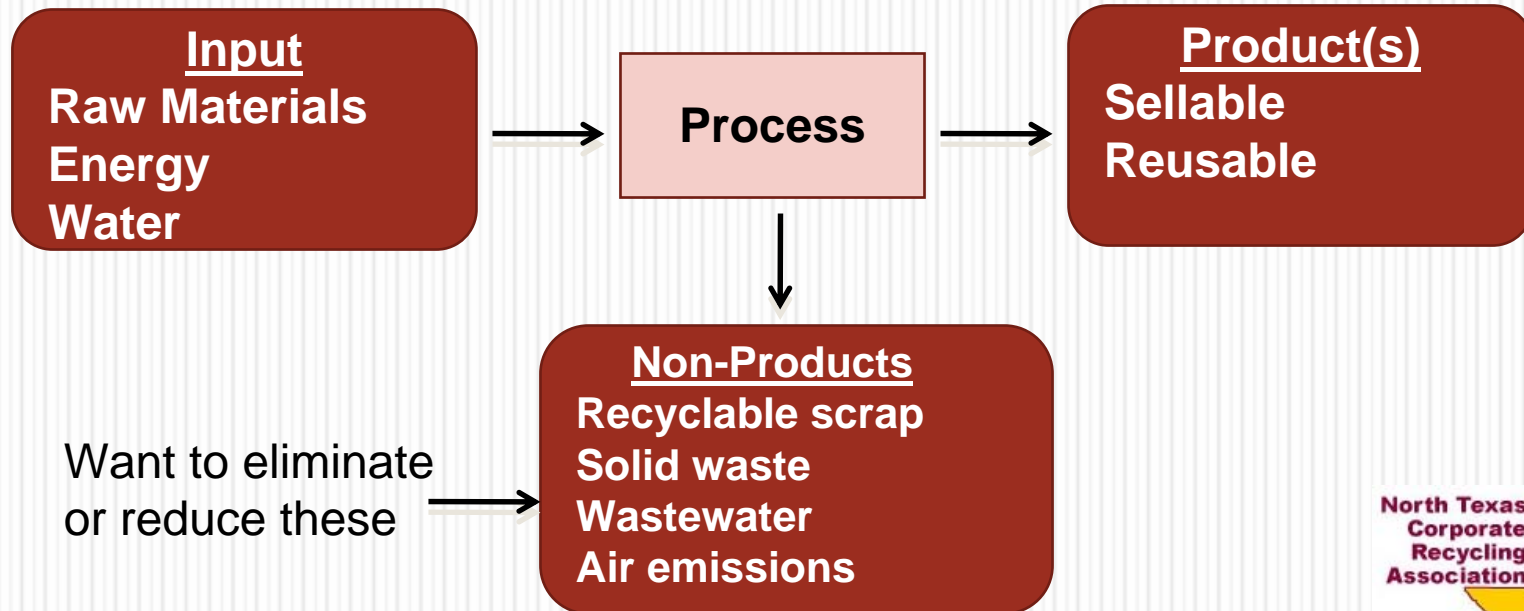


P2 Planning The Process

2. Identify your pollutants – Input/Output Technique

Draw a “chalk line” around area

List everything that goes in and out



P2 Planning The Process

2. Identify your pollutants – Input/Output Technique

Example: Making Coffee

Inputs

Coffee
Water
Filter
Cup
Creamer
Sugar
Stirrer



Product(s)

Cup of Coffee

Non-Product(s)

Coffee grounds
Waste filter
Waste cup
Burnt coffee
Waste stirrer



Wastes



P2 Planning

The Process

3. Identify activities generating pollutants

- Production, office, inefficient equipment, etc.
- Ties in with Step 2
- Examples (not an exhaustive list):

Manufacturing Environments

- Process change out
- Process startup/shutdown
- Inefficient /old equipment
- Equipment maintenance
- Cleaning/degreasing
- Poor quality
- Compressed air leaks

Distribution Environments

- Damage during material handling
- Expired/obsolete inventory
- Purchasing practices
- Vehicle/forklift maintenance
- Repackaging
- Defaced labels



P2 Planning

The Process

4. Prioritize pollutants

- May depend on disposal cost, toxicity, volume of waste
- Various prioritization techniques
 - “Bubble-Up” method
 - Matrix method
- Example list of pollutants:

Manufacturing Environments

- Wastewater treatment sludge
- Oily rags/wipes
- PVC coating scrap
- Air emissions - VOC
- Cardboard

Distribution Environments

- Cardboard
- Pallets – excess in good condition
- Pallets – broken
- Obsolete inventory
- Foam packaging
- Shrink wrap
- Banding



P2 Planning The Process

4. Prioritize pollutants

Matrix Method Example – Manufacturing Environment

**\$0.70/lb or
\$90,000/yr**

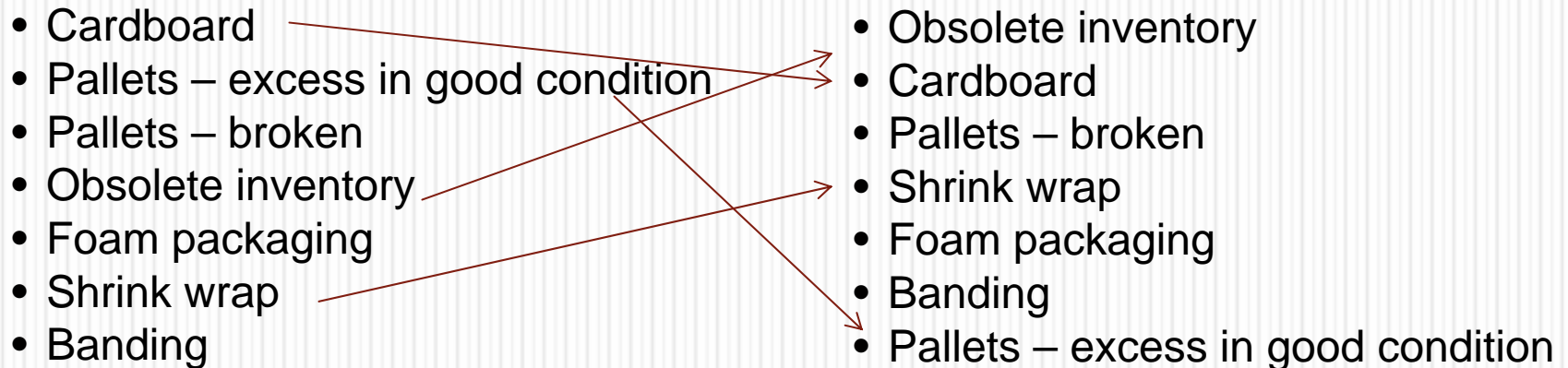
Waste Material	Volume	Disposal Cost	Recycling Revenue	Raw Material Cost	Toxicity	Other
PVC Coating Scrap	75 tons/yr	N/A	\$0.15/lb or \$22,500/yr	\$0.85/lb or \$112,500/yr	Low	
VOC Air Emissions	15 tons/yr	N/A	N/A	\$14,000/yr	Medium	Requires Permit
Wastewater Treatment Sludge	50 cy bags/yr	\$40,000/yr	N/A	N/A	High	
Oily Rags/Wipes	25 cy box/yr	\$5,500/yr	N/A	\$23,000	Low	
Wooden Pallets (broken)	25 roll-off/yr	\$7,500/yr	N/A	N/A	Low	

P2 Planning

The Process

4. Prioritize pollutants

- Bubble-Up Method
 - Compare pollutants against each other one at a time
 - Place higher priority above lower priority
- Bubble-Up example: Distribution Environments



P2 Planning The Process

5. Prioritize projects
 - Generate list of potential projects or ideas for potential projects
 - Evaluate:
 - Economic benefit
 - Technical implementation feasibility
 - Risks – long term vs. short term liability
 - Schedule
 - Tackle “low hanging fruit” first



P2 Planning The Process

5. Prioritize projects - Example:

- Project 1: Install filter press to reduce wastewater treatment sludge.
 - Implementation Cost - \$25,000
 - Reduce sludge by 50% = \$20,000/yr
 - Reduces long term liability of sludge disposal
 - Requires capital expense approval which will take a year
- Project 2: Employees are not using oily rags completely. Train employees on proper use of rags to use until saturated.
 - Implementation Cost – labor time for training
 - Goal - decrease oily rag waste by 30%
 - \$1,650 disposal cost + \$6,900 rag purchasing cost

Implement 1st



P2 Planning

The Process

6. Develop measurable goals

- Reduce broken pallets by 20% in warehouse and distribution.
- Increase scrap metal recycling by 10% from the metal cutting operations.

7. Document your P2 Plan

- If subject to TCEQ P2 Planning regulations then must meet certain documentation requirements.
- Documentation should include
 - List of Prioritized Pollutants
 - Prioritize projects with time frame for implementation
 - Define responsibilities



P2 Planning

The Process

8. Employee awareness and involvement

- **Critical to success!!**
- Owner/Management must set the example!
- Clearly express company policy and expectations regarding program from the top down
- Appoint an enthusiastic “Recycling Leader” liaison
- Explain how a successful recycling program will benefit the company
- Make sure program rules are easy to understand and follow
- Follow up with results reporting



P2 Planning

The Process

9. Measure your results

- P2 Team should meet regularly to discuss project status, success and changes to plan if necessary
 - Regular meeting will keep focus on P2 projects
- Direct – disposal cost, tipping fees, raw material costs
 - Example: Recycling one 40 yard compactor of cardboard generates \$100 in revenue and \$400 in cost avoidance (no tipping/disposal fees). Total savings per haul = \$500.
- Indirect cost – labor, building space, decreased liability, increased production efficiency, safer work environment



P2 Planning

Implementation Techniques & Resources

- Segregate Waste - facilitates reuse and recycling
- Good Housekeeping – decreases waste, frees up space, decrease spills/leaks
 - Reusable absorbent pads
 - www.circle.net
- Reduce waste volume
- Find and repair leaks
 - Compressed air
 - Water
 - Equipment
 - Fugitive emissions



P2 Planning

Implementation Techniques & Resources

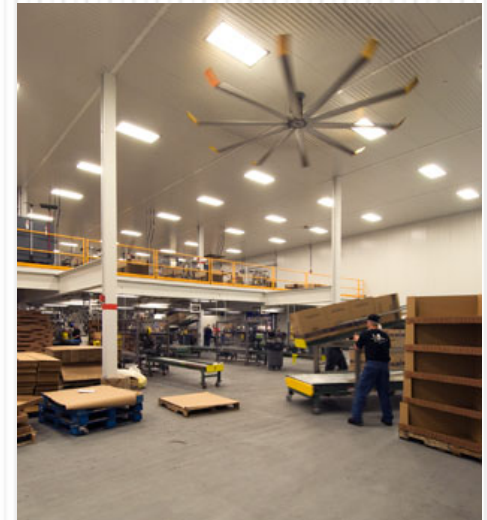
- Inventory Control
 - Purchasing techniques – eliminate minimum quantity buys
 - Bar coding/RFID tracking of inventory
 - First-In-First-Out (FIFO)
- Packaging – cardboard, shrink wrap, banding, foam
 - Implement reusable packaging
 - Bale or compact to facilitate recycling
 - Redesign packaging to reduce size, eliminate a material, facilitate recycling



P2 Planning

Implementation Techniques & Resources

- Cardboard Pallets
 - Easier to export – avoid wood treatment requirements
 - Recyclable and made from recycled content materials
 - Freight savings – weigh less than wood pallets
- Energy Savings
 - Cool roof technologies – apply heat reflective coating on roof
 - Air circulation – reduce heating/cooling costs
 - www.bigassfans.com



P2 Planning

Implementation Techniques & Resources

- NTCRA – www.ntcra.org
 - Recycling Resource List
- TCEQ – www.P2Plan.org
- Zerowastenetwork.org
- Energy Star – www.energystar.gov
- Cleaning and coating
 - www.partscleaningweb.com
 - www.paintcenter.org
- Sustainable Packaging
 - www.sustainablepackaging.org



P2 Planning

Keys to Success

- Involve employees
- Tackle low hanging fruit first
 - Show positive results quickly for increased “buy in”
- TCEQ Guidance RG-409 or www.P2plan.org
- Remember: you eat an elephant one bite at a time.

