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# Pollution Prevention and Opportunities by Media Sector

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## Create a Checklist

before you walk in the door

- Eight broad categories:
  1. Pollution Prevention (P2 initiatives/assessments)
  2. Environmental Management System (EMS), chemical inventory management system
  3. Product Stewardship (life cycle assessment)
  4. Energy (usage/costs)
  5. Air emissions
  6. Water use/discharge
  7. Solid Wastes
  8. Hazardous Wastes



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## Media-specific Areas


- Solid Waste
- Hazardous Waste, Hazardous Materials
- Wastewater
- Air Emissions
- Energy Use
- Water Use (Conservation)

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## Solid Waste


- Look for large quantities (volume)
- Look for high weights
- Look for mixes of waste (lack of waste segregation)
- 3 R's: Reduce, Reuse, Recycle where feasible

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## One man's trash is another man's treasure


- Mixed plastics have low recycling value
- Same for metal scrap (don't mix)
- Improving the efficiency of one operation may eliminate another operation (typically seen in cleaning operations).
- Rework means less scrap (lean manufacturing and process improvements also mean less scrap)
- Plating sludge is rich in metals (copper, nickel, etc.)
- Combustibles: plastic packaging waste, paper waste (think composting, recycling, or fuel)
- Is the waste product from a process of value to some other industry?

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## Solid Waste Example


- Tecmotive was able to reduce their glass bead blasting operation by almost 75% by altering their bead blasting nozzles (increased aperture size).
- Result: glass bead purchases dropped by 3,600 pounds per year.
- Their bead blast **waste** also dropped by the same amount.

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## Hazardous Waste

- Acids
  - Reuse, extend life?
- Alkalis
  - Reuse, extend life?
- Metals such as chrome, lead, nickel
  - Closed loop with plating chemistry supplier?
- Flammable solvents
  - Re-distillation for reuse, switch to aqueous?
- Toxics
  - Alternative chemicals, alternative processes?

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## Acid Waste Reduction

**Baseline:** TECT Power was having to dump acid baths between as short as 1 week to 4 weeks. This included “spiking” the baths with fresh acid to extend the bath life.

It was found that the bath life could be extended to at least 7 weeks by developing better bath procedures (measurement and control)


**Result:** Doubling of the acid bath life (1/2 the acid waste)

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## Wastewater


- Is the volume high and from a particular process?
- Is there a good reason for the high volume?
- Is there anything of use in the wastewater?
- Can the wastewater be reused in another process?
- What is being treated in the wastewater? COD, BOD, acids, bases, metals, oils?

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## Washwater Example: Southco


- **Baseline:** Parts bowl fed at each of 4 to 8 process steps
- Parts lubricated with oil at each process step
- Oily parts don't bowl feed well
- Therefore, parts got washed 4 to 8 times depending on the part type
- **Result:** Washwater use = 170 gallons/week (8500 g.p.y.)

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## Change to Process

- **Challenge:** bowl feed oily parts
- A stick-on “fabric”\* to cover the feeder bowl base and feeder ramps allows oily parts to bowl feed
- Therefore, oily parts only need to be cleaned after the last process step when they are ready to ship
- **Result:** Washwater loading with oil went down so consumption went to approximately 170 gallons/month (4x increase in life)



\*Brushlon® by 3M




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## Air Emissions

- VOCs and HAPs
- Technology is changing rapidly for paints and cleaning technologies. Does the process look state-of-the-art?
  - Ask about overspray on painting operation
- Do they have a Title V permit due to VOCs or HAPs?
  - Time to look at process changes to reduce the permitting level to a state facility operating permit or registration.



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## Air Emission Example

**Baseline:** Cummins Engine had been gradually converting its engine paints from solvent based to water based.

- Their highest volume paint had not been switched over due to production rate concerns.
- Our paint curing study showed that there was no difference in cure rate between their solvent and water based paints. So the switch to water base had no production risks

**Result:** VOC reduction of 19% after changeover

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## Energy Use

- Heating: living spaces, process heating
- Cooling: living spaces, process cooling
- Machinery: pumps, fans, motors
- Loading dock air losses
- Cogeneration: Some wastes can become fuel.

Look for cold areas in summer, hot areas in the winter. This indicates losses that may be correctable.

Ask about equipment that runs continuously. This type of equipment may benefit from an energy assessment.


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## Energy Use Example

- American Motive Power was painting engines and using **convection heating** to cure the paint.
- It was determined that the parts could be cured in the same amount of time using **infrared heating**
- Result: ~50% less energy is used with infrared curing

NOTE: Cost benefits and paybacks will depend on the size of the convection oven compared to the capital investment in an infrared system.




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## UV Curing Paints


- A rapidly developing technology: better properties, cost going down
- Low or no VOCs
- Much lower energy use to cure the coating
- Much faster curing (economic benefit, less work in process)


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## Powder Coating

- A maturing technology
- Low or no VOCs
- Typically can be cured by convection or IR heating
- High durability coating
- **New Development**      **UV curing powder coating (low VOCs and low energy to cure)**




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## Water Use (Conservation)



- Is water usage high? Are there specific processes which are the primary users?
- High water usage may have reuse possibilities.
- Is any of the water being heated or chilled? If so, can this energy be recovered?

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## Water Use Example

- **Baseline:** rinse immersion to clean parts between plating steps. The immersion tank had a constant flow of clean water to keep the contaminant levels down; 360,000 gallons per year per tank.
- Switching from immersion rinse to a timed spray rinse reduced the water use from 3 gallons per minute to 0.8 gallons per minute. This reduced the water use by 73% for that operation.



**Result:** 96,000 gallons per year per tank (\$700/tank)


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## Questions?

## Ideas?

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