

# Potential Projects for Pollution Prevention Loan Program

## General Manufacturing      Metal Finishing      Printing      Dry Cleaning      Agriculture

### Equipment/ Technology Modification

- |  |   |   |   |  |
|--|---|---|---|--|
| <ul style="list-style-type: none"> <li>• Ion exchange systems</li> <li>• Closed loop systems</li> <li>• Chemical recovery</li> <li>• Distillation or evaporators</li> <li>• Filtration-reverse osmosis</li> <li>• Clarifiers</li> <li>• Air knives equipment</li> <li>• Countercurrent rinsing</li> <li>• Centrifuge or cyclone to remove paint solids from water arrestor holding tanks</li> <li>• Drain boards</li> <li>• Drag out tanks</li> <li>• Inventory control software</li> <li>• Air compressors</li> <li>• Dryers</li> <li>• Pumps</li> <li>• Dust collection system</li> <li>• Mixers</li> <li>• Process control equipment (i.e., pH sensors, conductivity meters)</li> </ul> | <ul style="list-style-type: none"> <li>• Rinse or drag out tanks</li> <li>• Freeboards</li> <li>• Hang bars</li> <li>• Automating the line for efficiency ion exchange systems</li> <li>• Closed loop systems</li> <li>• Chemical recovery distillation or evaporators</li> <li>• Filtration (reverse osmosis)</li> <li>• Electrowinning</li> <li>• Clarifiers</li> <li>• Air knives equipment</li> <li>• Countercurrent rinsing</li> <li>• Conductivity equipment</li> <li>• Durometers</li> <li>• Segregating waste streams for recycling/recovery</li> </ul> | <ul style="list-style-type: none"> <li>• Silver free photographic film</li> <li>• Ion exchange systems</li> <li>• Filtration-reverse osmosis</li> <li>• Automatic mixing units for fountain solution</li> <li>• Automatic blanket washers</li> <li>• Solvent distillation</li> <li>• Parts washer</li> <li>• Dispense metered solvent</li> <li>• Automatic towel wringer</li> <li>• Explosion-proof centrifuge VOC control by fume incineration (oxidation) in heatset web press</li> <li>• Waterless printing technology</li> <li>• Digital printing technology</li> <li>• Automatic ink levelers</li> <li>• Pumping equipment</li> <li>• Ink agitator</li> <li>• Recirculating chiller unit to keep fountain solution clean &amp; reduce evaporation</li> </ul> | <ul style="list-style-type: none"> <li>• Use on-site recovery techniques (distillation)</li> <li>• Replace cartridge filters w/spin disk filters that can be cleaned w/out opening</li> <li>• Use carbon absorber that is regenerated w/hot air stripping rather than steam stripping</li> <li>• Replace a transfer machine with a dry-to-dry machine</li> <li>• Upgrade to a dry-to-dry machine</li> <li>• Install machine wet washing equipment</li> <li>• Install a liquid carbon dioxide dry cleaning machine</li> <li>• Install high efficiency boilers, water conditioning equipment, &amp; energy recovery equipment</li> <li>• Install secondary containment pans &amp;/or dike system</li> </ul> | <ul style="list-style-type: none"> <li>• Grid sampling, GIS equipment</li> <li>• Composting (turner, buildings, application equipment)</li> <li>• Conservation tillage</li> <li>• Manure/chemical injection systems</li> <li>• Pesticide/fertilizer/manure application &amp; handling</li> </ul> |
|--|---|---|---|--|

### Process/ Procedure Modification

- |  |   |   |  |  |
|--|---|---|--|--|
| <ul style="list-style-type: none"> <li>• Closed loop systems</li> <li>• Semi-aqueous cleaning/aqueous cleaning</li> <li>• Metal recovery</li> <li>• Increase dwell time</li> <li>• Agitate rinse baths</li> <li>• Flow control valves</li> </ul> | <ul style="list-style-type: none"> <li>• Wetting agents</li> <li>• Change viscosity by changing the solution</li> <li>• Closed loop systems</li> <li>• Semi-aqueous degreasing/aqueous degreasing</li> <li>• Metal recovery</li> <li>• Increase dwell time</li> <li>• Agitate rinse baths</li> <li>• Install flow control valves</li> </ul> | <ul style="list-style-type: none"> <li>• Intermittent control of film wash water</li> <li>• Water washable lithographic ink system</li> <li>• Aqueous plates</li> <li>• UV or electron beam inks or coatings</li> </ul> | <ul style="list-style-type: none"> <li>• Modify processes &amp; equipment to reduce solvent vapor loss to recover solvents for reuse. Add-on carbon adsorption or refrigeration units can be used</li> <li>• Extract solvents from filters as thoroughly as possible. Gravity drainage and “cooking” are commonly used techniques</li> </ul> | <ul style="list-style-type: none"> <li>• Chemical mix/load pads</li> <li>• Chemical injection systems</li> </ul> |
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# Potential Projects for Pollution Prevention Loan Program

## General Manufacturing

## Metal Finishing

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### Process/ Procedure Modification cont'd.

#### Reformulation, Reclamation, or Redesign

- Optimize part geometry
- Replace solvent-based cold cleaning systems with other chemicals such as terpenes (d-limonene & *a*-pinene)

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- Replace solvent-based cold cleaning systems with other chemicals such as terpenes (d-limonene & *a*-pinene)
- Optimize racking

- Silver recovery (ion exchange)
- Recycling film developer
- Recycling of solvent cleaners
- Recycle/reblend inks on-site or off-site (vendor)
- Energy recovery for inks
- Return unused ink to supplier
- Reclaim metal plates
- Anti-skinning products to prevent ink dry-up during shutdown & recycling of scrap film
- Paper stock
- Skid wrappers
- Rolls
- Cardboard
- Used oil & rubber blankets

- Add steam or hot water line insulation
- Install a "closed loop perc delivery system"

- If solvents cannot be made reusable, find a way to recycle them (e.g., purchase solvents from a company that will pick up & recycle the spent solvent)

- Recycling of solvent cleaners
- Recycle/reblend oils on- or off-site
- Used oil & rubber
- Energy efficient watering systems
- Livestock fencing
- Heating/cooling systems
- Solar/wind power generators

#### Raw Material Substitution

- Substitute nonhazardous ingredients for hazardous material
- Substitute biodegradable materials for persistent material where possible

- Substitute plating chemicals to a less toxic chemical

- Alcohol substitutes in fountain solution without HAPs water-based adhesive (polyvinyl acetate)
- Nonhazardous washer solvent
- Water-miscible solvent cleaners (hydrocarbon-based solvent cleaners mixed with water for blanket & roller cleaning)
- Low VOC solvent cleaners
- Switching from a petroleum oil-based ink to a vegetable oil-based ink such as soy or linseed oil

- Alternative petroleum solvents are being developed with lower VOC contents

- Closed loop recycling
- Substitute nonhazardous ingredients for hazardous material
- Substitute biodegradable materials for persistent material

# Potential Projects for Pollution Prevention Loan Program

## General Manufacturing

### Housekeeping Maintenance Inventory Control Improvements

- Recover oils, solvents & other cleaning materials for reuse & recycling
- Preventative maintenance activities

## Metal Finishing

- Rack & barrel maintenance

## Printing

- Closed containers
- Recycling materials through supplier or recycling service
- Purchasing in bulk
- Standardizing pallet sizes
- Waste exchange
- Shop towel management
- Clean rubber gloves for reuse and paper waste reduction

## Dry Cleaning

- Size garment loads correctly
- Use spigots & pumps when dispensing new materials & funnels when transferring wastes to storage containers
- Close dryer door immediately upon completion of transfer
- Clean the filters that precede carbon filters weekly
- Clean lint screens to avoid clogging fans & condenser
- Open button trap & lint baskets only long enough to clean
- Check baffle assembly in cleaning machine biweekly
- Conduct transfer of solvent-saturated clothes from washer to dryer as quickly as possible
- Replace seals & gaskets as soon as they no longer form a tight seal

## Agriculture

- Barnyard roof guttering
- Recover oils, solvents & other cleaning materials
- Preventative maintenance
- Recordkeeping

### Employee Training

- Water conservation
- Leak & spill prevention
- Energy conservation
- Material handling
- Maintenance, storage & office areas

- Manual drag out time
- Maintenance of equipment for proper efficiency

- Waste reduction techniques
- Water-use reduction
- Painting techniques
- Housekeeping & spill control
- Waste segregation

- Waste reduction techniques
- Water-use reduction
- Housekeeping & spill control
- Waste segregation
- Perform boiler & water conditioning tune-ups

- Water & energy conservation
- Leak & spill prevention
- Material handling
- Maintenance, storage & office areas, equipment efficiency
- Waste reduction & segregation techniques
- Housekeeping & spill control

### Energy

- Studies that determine the power factor, changing the hours of operations to lower energy costs & the installation of light timers or upgrades to more efficient lighting

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- Ventilation systems
- Soil testing
- Light efficiency upgrades
- Solar & wind power generators
- Agricultural energy production systems



# Potential Projects for Pollution Prevention Loan Program

## General Manufacturing

- On-Site Water Conservation**
- Shut-off valves
  - Recycle/reuse water
  - Timers & foot pedals

## Metal Finishing

- Shut-off valves
- Countercurrent rinsing systems
- Recycling of water
- Timers & foot pedals

## Printing

- In-process water recycling
- Countercurrent rinsing

## Dry Cleaning

## Agriculture

- Shut-off valves
- Recycle/reuse water
- Countercurrent rinsing systems
- Recycling of water
- Backflow devices
- Nurse tanks, transfer pumps & transport
- Barn gutters
- Retention areas
- Irrigation systems
- Tiling



Jennifer M. Granholm, Governor ♦ Steven E. Chester, Director



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Authority: PA 451 of 1994    Total Copies:  
 Total Cost: \$565.50    Cost Per Copy: \$.188  
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