



dallas water utilities
city of dallas

P2 FACT SHEET

What is P2? Pollution Prevention (P2) is a method of analyzing and modifying process inputs in an effort to minimize non-product outputs. P2 is about efficiency. As non-product outputs are minimized then materials & resources are used more efficient and profits are maximized.

Why is the City of Dallas interested in P2? Through P2 programs, businesses get into and stay in compliance with environmental laws, improve profits, improve productivity and become more environmental friendly. Also this helps the city reduce its costs for treatment, reduces interference with the operation of treatment facilities, reduces risk of pass-through of toxic pollutants, prevent violation of water quality standards, prevent POTW sludge contamination, protect worker health and safety and builds treatment capacity at the wastewater plants. This in turn saves tax dollars.

GENERAL POLLUTION PREVENTION CATEGORIES & ACTIVITIES

Good Operating Practices

- ▶ Improve housekeeping
- ▶ Separate types of wastes to make them more amenable to reuse/recycling
- ▶ Separate hazardous waste from non-hazardous waste
- ▶ Segregate wastes
- ▶ Improve preventive maintenance scheduling, record-keeping, or procedures
- ▶ Change production schedule (e.g., lean manufacturing, statistical process control, etc.)
- ▶ Develop Environmental Management System (e.g., ISO 14000, etc.)
- ▶ Train employees to operate equipment and processes more efficiently
- ▶ Train employees on importance of pollution prevention and detecting and reducing material losses
- ▶ Reuse samples in process, automate testing, or use non-destructive testing
- ▶ Reduce evaporation of VOC, HAP's, and water through improved procedures
- ▶ Tune-up boilers, ovens, and furnaces to maximize heating and energy efficiency
- ▶ Solicit suggestions for improving procedures and processes from employees
- ▶ Allocate waste treatment and disposal costs to activity, process, or operation that generates the waste
- ▶ Allocate energy and water costs to the specified product or process

Inventory Control

- ▶ Institute procedures to reduce outdated material [e.g., just-in-time delivery, pharmacy system, first-in-first-our (FIFO) etc.]
- ▶ Test outdated material
- ▶ Validate shelf-life for stable materials
- ▶ Use better labeling procedures
- ▶ Use a material exchange to purchase or sell by-products and other materials (e.g., Renew Material Exchange Program www.renewtx.org 512-239-3171)
- ▶ Modify purchasing procedures (e.g., non-hazardous materials, buy when needed)
- ▶ Negotiate “take-back” program with suppliers
- ▶ Use bulk delivery systems or returnable containers
- ▶ Train employees on proper inventory control procedures

Spill and Leak Prevention and Cleanup

- ▶ Improve storage and stacking procedures
- ▶ Improve procedures for loading, unloading, filling, draining and transfer operations
- ▶ Install overflow alarms or automatic shut-off valves on tanks
- ▶ Install vapor recovery systems
- ▶ Implement inspection or monitoring program of potential spill and leak sources
- ▶ Use “dry clean” methods to cleanup spilled liquids and dry materials
- ▶ Train employees on spill prevention procedures and proper cleanup methods

Raw Material Modifications

- ▶ Increase purity of raw materials
- ▶ Consider alternative feedstock from other processes
- ▶ Substitute non-hazardous for hazardous raw materials
- ▶ Substitute less hazardous raw materials

Surface Preparation and Finishing

- ▶ Eliminate need to paint or finish
- ▶ Proper storage and corrosion of parts
- ▶ Use spray systems with high transfer efficiency (e.g., LVLP guns, etc.)
- ▶ Use low-VOC coating materials and/or improve application techniques
- ▶ Change from spray to other systems (e.g., powder painting, etc.)
- ▶ Standardize coatings and finishes and paints and colors
- ▶ Remove and recover material from tanks and containers prior to cleanup, rinse, or disposal

Process and Equipment Modifications

- ▶ Improve production planning and scheduling to reduce wastes, energy use and water use
- ▶ Institute a program to reduce rejects, off-spec products, and re-work
- ▶ Increase use of instrumentation
- ▶ Increase use of automation
- ▶ Institute recirculation within a process (e.g., cooling towers, closed-loop operations)
- ▶ Modify equipment, layout, or piping
- ▶ Clean immediately after use
- ▶ Use more efficient equipment, layout, and/or technology
- ▶ Use of a different process catalyst
- ▶ Reduce stack losses (e.g., non-product output, heat exchanger, and more efficient fuel)
- ▶ Reduce evaporation losses (e.g., capture for reuse or substitute materials, process, or technology)
- ▶ Institute better controls on operating bulk containers to minimize empty container disposal. Change from small containers to bulk containers to minimize empty container disposal. Improve quality controls (e.g., decrease waste-to-raw material ratio)

Product Modifications

- ▶ Reduce packaging
- ▶ Use returnable packaging for reuse
- ▶ Increase purity of materials
- ▶ Avoid overfills, over specifications, and excess products
- ▶ Substitute non-hazardous for hazardous materials

Cleaning and Degreasing

- ▶ No clean option
- ▶ Standardize procedures to reduce type and amount of cleaners/degreasers (solvent) used
- ▶ Use "dry clean" methods (e.g., pre-clean removal of accumulated debris, abrasives)
- ▶ Modify stripping/cleaning equipment or automate to use less cleaner
- ▶ Change to mechanical stripping/stripping/cleaning devices (from hazardous solvents to other materials, ultrasonic)
- ▶ Use bio-parts washer
- ▶ Change to aqueous cleaners
- ▶ Substitute cleaner that results in less waste or use less hazardous cleaner
- ▶ Use low-emission vapor degreasing (LEVD)
- ▶ Reclaim solvent by distillation
- ▶ Reuse cleanup solvent
- ▶ Modify containment and cleanup procedures
- ▶ Improve draining procedures
- ▶ Redesign parts racks to reduce drag out (e.g., more drain time)
- ▶ Recover material from tanks and containers prior to rinsing
- ▶ Modify or install more efficient rinse systems (e.g., countercurrent rinsing, pared rinsing)
- ▶ Improve wash and rinse equipment design and operation

POLLUTION PREVENTION ACTIVITIES FOR SELECTED PROCESSES & OPERATIONS

Boilers

- ▶ Optimize boiler size and boiler loading
- ▶ Analyze flue gas and optimize air-to-fuel ratio
- ▶ Install over-fire draft control
- ▶ Convert to atomizing burners
- ▶ Install characterizable fuel valve
- ▶ Clean boiler tube
- ▶ Establish burner maintenance schedule
- ▶ Install stack dampers
- ▶ Recover waste heat from flue gas or blowdown to pre-heat combustion or pre-heat feedwater
- ▶ Minimize boiler blowdown with better feedwater treatment
- ▶ Automate blowdown control
- ▶ Turn off hot water circulation pump when boilers are not in use
- ▶ Fuel-switch to less carbon-intensive fuel

Chemical Precipitation

- ▶ Minimize the amount of influent
- ▶ Use precipitation method best suited for the application and resulting in the least volume of hazardous sludge
- ▶ Automate and optimize chemical dosages based on “demand” or need
- ▶ Concentrate sludge prior to disposal
- ▶ Recover usable materials from sludge
- ▶ Return decant to process

Compressed Air Systems

- ▶ Use cooler air for compressor intakes
- ▶ Install, upgrade or adjust compressor controls
- ▶ Right-size compressors/optimize loading
- ▶ Reduce pressure
- ▶ Eliminate compressed air use
- ▶ Repair air leaks
- ▶ Recover waste heat
- ▶ Change dryer filters
- ▶ Clean intercoolers
- ▶ Adjust operating schedules to minimize equipment idle time
- ▶ Remove or close off unused compressor air lines

Cooling Towers

- ▶ Eliminate use of once-through cooling
- ▶ Use water from once-through cooling systems for makeup water
- ▶ Use pretreated and compatible effluent from other processes
- ▶ Use collected rainwater and stormwater for makeup water
- ▶ Use sidestream filtration to reduce makeup water
- ▶ Improve method of releasing blowdown to maintain conductivity close to limits
- ▶ Treat water to improve “cycles of concentration” (e.g., maximize recirculation)
- ▶ Use scale inhibitors that require minimum treatment of blowdown

Degreasing (Parts Cleaning & Washing)

- ▶ Pre-clean parts
- ▶ No clean option
- ▶ Standardize procedures to reduce type and amount of cleaners/degreasers (solvent) used
- ▶ Cover solvent cleaning units
- ▶ Use “dry clean” methods (e.g., pre-clean removal of accumulated debris, abrasives)
- ▶ Modify stripping/cleaning equipment or automate to use less cleaner
- ▶ Change to mechanical stripping/cleaning devices (from hazardous solvents to other materials, ultrasonic)
- ▶ Improve parts draining procedures before and after wash
- ▶ Change to aqueous cleaners
- ▶ Use bio-parts washer
- ▶ Substitute cleaner that results in less waste or use less hazardous cleaner
- ▶ Use low-emission vapor degreasing (LEVD) or low-VOC degreasers
- ▶ Monitor, maintain and replace seals
- ▶ Recover, reclaim, and reuse solvents (filter, distill, etc.)
- ▶ Avoid cross-contamination of solvents
- ▶ Operate only when needed

Energy Reduction and Efficiency

- ▶ Install higher efficiency overhead lighting
- ▶ Install motion sensors
- ▶ Turn off unneeded equipment and lights
- ▶ Find and repair compressed air, steam and water leaks
- ▶ Set-back thermostat
- ▶ Minimize peak-demand loading to reduce electric bill
- ▶ Correct power factor to reduce electric bill
- ▶ Insulate windows and doors
- ▶ Replace worn motors with high efficiency ones

Management Strategy

- ▶ Develop source reduction (P2) plan
- ▶ Train employees to be aware of waste reduction opportunities
- ▶ Account for waste treatment/disposal expenses as a direct cost of producing a product

Material Handling

- ▶ Segregate raw and waste material containers
- ▶ Segregate different waste materials in separate containers
- ▶ Purchase in bulk or larger containers
- ▶ Inventory control to reduce waste
- ▶ Label all containers properly
- ▶ Label process tanks

Materials Recovery

- ▶ Recovery rate is optimized
- ▶ Recovered materials are concentrated prior to transport or disposal
- ▶ Recovered materials are sold or reused on-site or off-site
- ▶ Remaining material is reused

Neutralization

- ▶ pH adjustment with chemicals from other processes or from materials exchange
- ▶ Chemical dosage is automated
- ▶ Chemical dosage is optimized
- ▶ Wastes monitored during neutralization to maintain desired pH

Painting Operations

- ▶ Use high transfer efficiency equipment (electrostatic, HVLP guns)
- ▶ Use high-solids coating (e.g., powder paint)
- ▶ Segregate wastestreams
- ▶ Use cheesecloth over filters to reduce spent filter generation
- ▶ Procedures to minimize over-spray
- ▶ Recycle over-spray from powder paint
- ▶ Training to improve transfer efficiency
- ▶ Use gun washer equipment for cleaning
- ▶ Reduce use of solvent-based and metal-based paints
- ▶ Schedule light colors first to minimize switch-over line waste

Plating, Etching & Metal Finishing

- ▶ Use lower temperature baths to reduce evaporation
- ▶ Prolong plating solution life through filtration, reducing drag-out, avoiding contamination, etc.
- ▶ Use lower concentration plating baths
- ▶ Redesign parts rack to reduce drag-out before the rinse and use air blow-off
- ▶ Use trivalent chromium instead of hexavalent
- ▶ Use noncyanide plating solutions such as chloride or sulfate solutions
- ▶ Use in-line recovery techniques
- ▶ Regenerate spent bath solutions
- ▶ Segregate all wastestreams
- ▶ Use spray of fog nozzle rinses to reduce drag-out
- ▶ Use wetting agents to reduce surface tension (minimized drag-out)

Rinse Water

- ▶ Use multiple rinse tanks
- ▶ Use countercurrent rinsing
- ▶ Install drainboards and drip tanks
- ▶ Install racks above plating tanks to reduce dragout
- ▶ Use fog nozzles and spray units
- ▶ Agitating rinse bath (air or solution agitation)
- ▶ Recycle and reuse spent rinse water through metal recovery (i.e., ion exchange, reverse osmosis, electrochemical)
- ▶ Segregate waste streams
- ▶ Use evaporator or other device for material recovery from rinse tanks and reuse in plating bath

Spill and Leak Prevention and Cleanup

- ▶ Use seal-less pumps
- ▶ Improve storage and stacking procedures
- ▶ Improve procedures for loading, unloading, filling, draining and transfer operations
- ▶ Install overflow alarms or automatic shut-off valves on tanks
- ▶ Install vapor recovery systems
- ▶ Install spill basins on dikes
- ▶ Install splash guards and drip boards
- ▶ Implement inspection or monitoring program of potential spill and leak sources
- ▶ Use “dry clean” methods to cleanup spilled liquids and dry materials
- ▶ Train employees on spill prevention procedures and proper cleanup methods

Washing

- ▶ Pre-wash (dry wipe) to remove accumulated grime
- ▶ Pre-wash (wet) to remove accumulated grime
- ▶ Wash when necessary (reduce frequency)
- ▶ Reduce wash and rinse times
- ▶ Minimize use of detergents and chemicals
- ▶ Use “clean” process water for washwater
- ▶ Collect, treat, and reuse rinse water for washwater
- ▶ Use most efficient spray equipment
- ▶ Repair leaks
- ▶ Reduce system operating pressure

Water Use and Reuse

- ▶ Install flow control valves
- ▶ Identify water flow into and out of each process
- ▶ Reuse clean or contaminated water
- ▶ Use timers/foot pedals to control usage
- ▶ Use counter current rinsing