

waste audit guide



Auckland
Regional Council
TE RAUHITANGA TAIAO

do you know the total cost of your company's waste disposal?

do you know where the waste is generated in your company?

In assessing waste generation in the industrial sector is becoming common practice to carry out a waste minimisation audit. This is an analytical tool designed to assure industrial managers that their organisation is operating in an environmentally safe and economically efficient manner. It is used to document the types and quantities of waste generated by an organisation. It provides a systematic approach to identify and evaluate different waste reduction options. The Audit will examine production methods to check:

- efficiencies
- costs
- wastes

In most cases the introduction of waste minimisation practices within a company does reduce costs.

In order to implement successful waste minimisation practices you need to:

- a set corporate goals for waste minimisation with specific percentages and timetables
- b allocate responsibility, time and financial support for the entire waste minimisation programme
- c involve all employees at all levels of the organisation

Waste Minimisation Audit Process

What to look for

- a look at the types and quantities of waste produced;
- b look for changes in the operations that could reduce the production of wastes;
- c look for materials that could be reduced or recycled or recycled within the company

Note: there are recycling systems available for: paper, glass, aluminium, metal and some categories of plastic. Ring Enviroline 09 366 2070 for industry contacts.

Where to look

Look at every activity in your company

- a in building and maintenance operations
- b in office and administration areas
- c in warehousing and storage areas
- d in receiving and distribution areas
- e in the production process
- f in cafeteria or food preparation areas

How to look

- a at each area ask 'what is being done?'
- b what type of operation is this?
- c how does this operation generate waste?
- d what is the cost of disposal?
- e how is this waste disposed of at the moment?
- f is this waste generation normal or an accidental amount?
- g is this waste generated on a daily/weekly/monthly total?
- h does the waste vary from season to season?
- i is any of this waste stored?
- j is the waste mixed? could it be kept separate?
- k could we do something with this waste?

in plant survey - where to start

draw a diagram of the plant layout

show:

- sewers layout
- location of all drains and rubbish bins
- stormwater drains
- final discharge points for effluent
- trade waste sewer
- flow diagram of all materials
- storage areas for bulk materials incoming
- dangerous goods storage
- bunding for protection of stored materials

check company records for the following:

- purchasing orders for raw materials/machinery plant
- water and sewer costs
- solid and hazardous waste management costs
- costs of operating on site treatment units
- production records
- water usage rates
- material safety data sheets
- manifests annual reports
- environmental permits

factors to evaluate

Stage 1 - human factors

all staff from top management down should be aware and committed to reducing waste

trained staff make responsible waste management decisions

do you have a programme to make your employees aware of waste management goals?

are your waste management personnel fully trained?

do you know the cost of training personnel to manage hazardous waste?

do you feel that your employees know things about your plant that you could take advantage of?

do you look on regulatory requirements solely as burdens? have you tried to reduce the cost of compliance by changes in management strategies?

Stage 2 - plant layout and waste segregation

by keeping wastes separate they are easier to process and recycle

do you know the location of all drains and rubbish bins? do you know bin removal schedules and destinations?

where do drains lead? is access controlled – or could someone use one for a convenient dump?

can you draw a process flow diagram showing raw materials and energy in, product out, by-products out, and return flows?

are by-products (which can be reused) mixed together or segregated?

can you find the end-point of each by-product output?

do you know characteristics and values of each by-product separately?

Stage 3 - water use and reuse

wash down water from vehicles, machinery or containers can contain oil, grit, dirt, concrete, dust or chemicals. These materials should not get into stormwater grates.

factors to evaluate

when used water is washed down stormwater drains it can cause pollution

do you know the water input into each unit process?
could contaminated streams or rinse waters be reused?
could water be reduced without hurting the product?

Stage 4 - product and raw material

by reducing or replacing toxic materials we create less toxic wastes. the best way to manage hazardous or toxic waste is not to create it in the first place

do you know the characteristics and chemical makeup of each raw material?
do you know how changes in raw material characteristics and amounts, and process variables, affect quantity and composition of by-products?
do you know the chemical composition of each by-product?
what substitutes could be made in raw materials?
what changes could be made in product?

Stage 5 - spills and contingencies

spills can cause pollution and put your company in an 'at risk' situation in respect to the Resource Management Act

does your spill containment plan include economics of treatment, recycling, or disposal?
do you know how the long term liabilities of your present waste practice?
have you ever spilled chemicals on the ground?
- how does that affect your responsibility to employees?
- the resaleability of your property?

Stage 6 - dangerous goods/hazardous wastes

do you have a dangerous goods store?
what containers are dangerous goods stored in?
is labelling appropriate?
how are dangerous goods cleaned?
do you inspect hazardous waste areas for leaks and malfunctions?
does your company use or store PCBs?
have the PCBs been registered with the Department of Health?
does your company use CFS Asbestos?
is there adequate bunding around hazardous wastes goods store?
when dealing with hazardous or toxic materials extra care must be taken
train staff to deal with emergencies, clean-ups and spills.
does your company have an action plan to deal with emergencies?

ideas to reduce waste and pollution

Waste Minimisation Opportunities

in materials handling:

- segregate raw and waste material containers
- segregate different waste materials in separate containers
- purchase materials in bulk or large containers
- control inventory to reduce wastage
- label all containers properly
- label process tanks
- check transfer of bulk material for leaks/spills
- install drip trays to collect residue material after processing

solvent cleaners : do you use solvents in your company?

- install/operate cleaning tanks properly
- avoid cross-contamination of solvents
- avoid water contamination of solvent/solvent contamination of water
- remove sludge continuously
- utilise tank cover or air knife to reduce surface evaporation
- monitor solvent composition
- consolidate cold clanging operations
- recycle spent solvent
- use plastic media blasting for paint stripping in place of solvent stripping
- use non-chlorinated solvents in place of chlorinated solvents where possible
- install vapour recovery system to capture vaporised solvents
- consider on-site distillation units
- evaluate work removal rate

plating/etching/metal finishing

- consider low temperate baths or an air knife to reduce surface evaporation
- prolong plating solution bath life through filtration, reducing dragout, avoiding contamination etc
- use lower concentration plating bath
- redesign part racks to reduce dragout prior to rinsing, possibly air blow-off use trivalent Cr in place of hexavalent Cr
- use non-cyanide plating solutions (ie chloride or sulphate solutions)
- use in-line recovery techniques
 - regenerate spent bath solutions
 - segregate all waste streams
 - maintain parts (ie racks, barrels, tanks) for cleanliness
 - use spray or fog nozzle rinses to reduce dragout
 - use wetting agents to reduce surface tension, thus minimising dragout
 - reuse rinse water
 - recover chrome and nickel plating solution by an evaporation unit

paint application

- use equipment with high transfer efficiency ie electrostatic
- use high solids coatings ie powder coatings
- segregate all waste streams
- use cheese-cloth over filters to reduce spent filter generation
- recycle overspray where possible ie powder coating
- evaluate use of various types of paint arresters – water wash, filters
- formal training for spray operators
- optimise spray conditions ie speed, distance from part, angle, pressure
- use booth coatings for easy booth cleaning
- inspect all parts ie racks for cleanliness
- use gun washer equipment for equipment cleanout
- reduce use of solvent-based and metals-based paints, where possible and utilise water-based coatings

use charged screen behind part with electrostatic system to reduce edge buildup and capture and reuse overspray paint

rinse water

- install/operate all rinse tanks properly
- use multiple rinse tanks
- use countercurrent rinsing
- install drain boards and drip tanks
- install racks above plating tanks to reduce dragout
- use fog nozzles and spray units
- agitate rinse bath (air or solution agitation)
- recycle and reuse spent rinse water through metal recovery techniques ie ion exchange, reverse osmosis, electrolytic etc
- segregate all waste streams
- use evaporator for material recovery from rinse tanks and reuse in plating bath

parts washing

- cover all solvent cleaning units
- use refrigerated freeboard on vapour degreaser units
- improve parts draining before and after washing

printing

- segregate and reuse waste wash solvents in ink formulation
- use vapour recovery system to recover solvents
- use distillation unit to recover waste alcohol solutions for reuse
- recover silver from fixer and developer solutions

oil/water separation

- use centrifuge system to recover cutting fluids
- chemical treatment
- filtration
- coolant regeneration

leaks and spills

- use seal-less pumps
- install spill basins on dikes
- install splash guards and drip boards
- install overflow control devices
- maximise use of welded pipe joints

water use/reuse

- flow control valves
- identify water inflow and outflow from each unit process
- evaluate reuse of clean or contaminated water
- use timers or foot pedals to control water usage
- use conductivity cells in plating rinse systems
- reactive rinsing

sludge dewatering

- use mechanical dewatering devices such as filter presses, centrifuges, vacuum filters, or compression filters
- keep different metals sludges segregated
- use filter bags
- use sludge driers

alkaline/acid cleaners

- install/operate cleaning tanks properly
- remove sludge frequently
- avoid cross-contamination of solvents
- reuse by filtering and rejuvenating
- remove dropped pieces frequently

storage areas

- bunding to prevent escape of spills etc
- decanting operations, residue management
- check leaks and spills
- check lids/contaminant seals
- check off-spec out of date material