



# إرشاد فنيي TECHNICAL GUIDELINE

### <u>رقم (Number (6) رقم</u>

التقليص أو الحد من النفايات

**Waste Minimization** 

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قسم الدراسات والتخطيط البيني- إدارة البيـــنة Environmental Planning and Studies Section (EPSS) Environment Department

#### Introduction:

Waste minimization is a practice or process through which the quantity of generated waste is reduced with the main objective of producing the least of unwanted by-products through the optimal use of raw materials, water and energy. It supports any company's aim for a "Clean technology" production which means full utilization of resources, cost savings in storage, treatment & disposal of generated waste by reducing its volume and its strength or concentration, improves environmental compliance, ensures profit, and promote corporate good image.

### **Benefits of Waste Minimization Practice:**

Waste minimization practice benefits not only the company or the waste generator, but the government regulatory agency as well. This includes:

- Increase of production, but lessen the waste generation;
- Saving money by reducing waste treatment & disposal cost, raw material purchases and other operational costs including storage;
- Optimize use of resources (like water);
- Enhance public and worker's health and safety;
- Improve environmental performance, regulatory compliance & meeting to any national waste minimization goals;
- Extend the useful life of landfills and disposal sites;
- Reduce potential environmental liabilities; and
- Promotes good public image on environmental protection.

#### **Techniques for Good Waste Minimization Practice:**

<u>Waste</u> as defined (in the Local Order) are "any matter whether solid, liquid, gaseous or radioactive which is discharged, emitted or disposed in such volume or manner as to cause an alteration to the environment; any otherwise discarded, rejected, abandoned, unwanted or surplus matter that can be recycled, reprocessed, recovered or purified by a separate operation or process from that which was produced; and any matter prescribed to be waste and as defined by a competent department."

A waste, therefore, is an excess material resulting from any activities which is discharged as reject and unwanted or any surplus material whether as a total useless matter or those that can be rendered useful again by recycling, treatment or recovery thru a different process from which it was originally produced.

Waste materials generated from manufacturing, processing & services from any industrial and commercial activities can be identified and grouped as follows:

- Off-specification raw materials (contaminated, expired or outdated)
- Off-specification spoiled products unfit for use or consumption
- Contaminated products, including spills and leakages
- Spent auxiliary materials (catalysts, solvents, filters, absorbents, etc.)
- Undesirable by-products from maintenance activities (oils, solvents, etc.)
- Undesirable products resulting from commissioning, start-up or process upset
- Process wastewater, including cooling & rinse water contaminated with chemicals
- Air emission from the process, including fugitives & dust
- Solid off-cuts, trimmings and excess materials
- Used container & packaging materials

Processes such as dilution of fresh water to reduce the strength of a generated waste, or by applying a simple dewatering process to reduce its volume are not considered as waste minimization.

As a guide in good waste minimization practice, the following are the techniques:

- 1. <u>Waste Reduction at source</u> this can be achieved by changing or modification of production process and/or equipments used, with assurance that product quality is not affected.
  - Product or raw materials substitution involves substitution of raw materials with that of less toxic substances and can produce the same product quality but of less residual unwanted by-products.
  - <u>Process control</u> includes the use of latest technology involving new equipment or the process itself. Its application, however, is process-specific and shall be carefully studied before being implemented for selection of the best and the most acceptable alternatives.
  - **Good housekeeping practice** is the key aspect in keeping waste minimization program a success and has a minimum capital requirement and yet provides the highest return on investment. This can be easily accomplished thru awareness programs & campaigns of company staff on the benefits of waste generation and its control. This includes proper waste segregation & waste classification to determine its quality, proper storage, and determining its value or usability. On the part of the management, regular waste audit for reconciling what goes in and what out are useful tool in determining the overall benefits of good and realistic housekeeping programs.
- <u>Waste Re-Use and Recycling</u> is the practice of recovering usable component of a declared waste for subsequent use in other purpose or sale either with or without pre-treatment. Generally, recycled materials

can either be used in the same service from which it was generated or in an entirely different premises, activities or purpose with consideration on possible mis-use, its effect, the efficiency and safety of the receiver or user.

3. <u>Treatment of Waste</u> – eliminates the toxic content of the waste stream, reduces the risk of pollution and health of the public, and increases its acceptability for discharge into the environment for its intended use. This also provides incentive to the user as it enhances the quality of waste and increases the potential for recycling.

### DM Waste Classification & Suggested Waste Minimization Techniques:

**Wastewater** – any contaminated or used water generated from residential, commercial, industrial and/or developmental activities.

- **Domestic wastewater** is a water-borne human wastes or sewage generated mostly from residential activities. This can be directly discharged to sewer line for treatment, or to be collected in septic tank for collection & disposal by an approved transporter to the DM centralized Sewage Treatment Plant (STP). Treated effluent is being used for irrigation.
- Trade waste is a wastewater generated from industrial activities (manufacturing, processing & services) and its quality is acceptable for discharge to municipality sewer. Most of the sources of this waste are being transported by an approved transporter to Al Awir STP with a required Disposal Permit from Environment Department – Environment Control Section.
- Hazardous Wastewater is any wastewater generated from industrial activities and its quality does not comply with the discharge limits to sewer. To make it acceptable for disposal to sewer, an in-house treatment from its source is required; or this can be disposed off to Jebel Ali Hazardous Waste Treatment Facilities following Environmental Control Section, Technical Guideline requirements.
- **Grey Water** is a lightly-soiled wastewater which are free of faeces content (sewage or black water) and is generated from bathing, hand basins & laundry; and can be re-used for toilet flushing, laundry or irrigation after treatment.

#### Waste minimization practice for Washing Process and other Water-Intensive Activities

Big amount of wastewater flow is often coming from washing activities. Simple cleaning process saves a lot of water. To minimize the generation of wastewater, a thorough survey of its source shall be made. This includes: identification of its flow, its quantity, the frequency of its generation, the contaminants, review of the site drainage system; and initiation of sampling and flow monitoring program. Some techniques of reducing the amount of wastewater required for washing consist of:

- The use of low-pressure hose instead of high-pressure hose.
- Removing of solid residues, inks, oil, chemical spills, etc. first by scraping, or other mechanical means on floors, tanks and most process equipments before washing with water.
- Proper scheduling of production (of or by batch) in such a way that similar products are produced in long period succession without the need of frequent complete washings of machines, equipments and the production area.
- Steam washing as compared to the used of chemicals in removing stains and solid resides, requires less amount of fresh water for final rinsing. This will also generate less toxic wastewater.

## For an effective wastewater sampling & monitoring program, the following important tips can be considered:

- Take separate grab samples (at the same sampling point/source) over a range of operating condition such as during full production, start up & shut down and each sample shall be analyzed separately. Similarly, composite sampling can be conducted on continuous plant operation for establishing a representative effluent quality of the plant activity.
- Results of laboratory analysis for parameters significant to the source of waste can be carefully studied to determine the most acceptable disposal option. This shall be constantly undertaken for further assessment of the company's waste minimization program.
- Wastewater flow from small and by batch discharges can be measured using the bucket-and-stop watch technique.
- Big or continuous wastewater flow can be measured by either installing an inline water meter or other means such as simple V-notch or other form of weir, or by float method on open stream discharges. Results of flow readings can be compared with the mass balance chart.

**Solid Wastes** – which are generated from residential, commercial and industrial activities are mostly recyclable. Household solid wastes which are also classified as garbage are normally being collected on trash bins, while solid wastes from commercial and industrial

activities are being collected by waste contractors. Initial step in solid waste recycling is waste segregation at source. It is very important to segregate the waste according to its type (like plastics, paper, glass, etc.) and packed or baled for ease of handling.

**Other Wastes** – such as used oil, spent chemicals, used printer cartridge & photographic wastes from film processing, contaminated containers, etc. can be recycled after going thru treatment or recovery process. There are other wastes classified as unwanted materials (like unsold products that has not reached the intended end consumer and mostly coming from importers, abandoned merchandise in ports, damaged packaging during transport, etc.) that although considered by its generators as still usable; this will end up as a waste and to be disposed off for the reasons of being illegal, confiscated, already expired due to long process of court litigation, or protecting the name of manufacturers.

#### Licensed or Authorized Waste Recycling Companies

There are companies with license from the Department of Economic Development (DED) to collect wastes for recycling or recovery. These companies are only authorized to collect the wastes generated in Dubai for recycling & recovery purpose and exportation of the same is prohibited unless otherwise approved in writing by the Director of the DM Environment Department. List of waste recycling companies is available at the DM Environment website.

Waste minimization requires commitment from the top management and its staff. It is the company's responsibility to make sure that waste management programs are timely implemented and staff shall be properly motivated, trained, set targets and regularly updated of the results of the program. Effective waste minimization can only take place with full knowledge of the sources of waste by-products, the quantities produced and the sources of contaminants. Environmental Control Section Technical Guideline for Waste Audit Requirements can be a guide in the preparation of waste audit report; as the final exercise of undertaking waste minimization can be formalized thru the records, data gathering assessment; and evaluation of the program.

Further information is available at Environmental Planning and Studies Section @ 04-6066809 / 6066814; Fax: 04-7033565 Or Visit the Dubai Municipality Website at: www.dm.gov.ae

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