



## Best Practices for Waste Management

### Scope

The scope of this best practice consists of guidelines that a facility could use to develop their own detailed and specific procedures for managing solid waste. Managing solid waste is part of companies' overall sustainability programs to minimize landfilled materials. With the exception of some generators of hazardous waste having certain plans, there is no regulatory requirement in the United States to have comprehensive written plans, but having a systematic plan is best practice. See also the related best practice, "Spill Planning, Reporting, and Response."

### Key Points

- The best waste management technique is to avoid generating waste in the first place. The hierarchy to minimize waste generation is reduce, reuse, and recycle.
- Have metrics to track and reduce waste disposal and to increase recycling.
- Have a robust new chemical review process in place for raw materials as well as maintenance chemicals and those brought on-site by contractors.
- Routine inspection of storage areas for waste and recycling is a must.

### Solid Waste Management Plan

The goal of a Waste Management Plan is to minimize waste sent off-site for disposal, to increase recycling, to ensure proper handling and storage of wastes, and to ensure regulatory compliance throughout the process. Metrics and goals to drive waste reduction progress shall be developed. These include amount of material landfilled (both hazardous and non-hazardous waste) and the amount of material recycled. Both the total amount and the amount per ton of product are typically tracked.

Best practice is to establish the following hierarchy to minimize waste generation and disposal and commentary is provided in this document.

- Reduce waste at the source
- Reuse materials in lieu of disposal
- Recycle

Once waste is generated, the waste must be identified, labeled, segregated, stored, and disposed of to qualified treatment/disposal/recycling facilities as appropriate.

### Types of Waste

**Common Waste**— Includes food waste, office trash, empty chemical bags, empty paint cans which have less than 1 inch of residue and do not have flowable material in them, empty jars or buckets which have been triple rinsed.

**Special Waste and Hazardous Waste** - These are typically chemical wastes or substances contaminated with chemicals. Special waste is that which does not meet the definition of



hazardous waste but must be disposed of in landfills appropriate for chemicals. Special waste must be sufficiently solidified as to be non-flowable, and this can be arranged with the landfill company if so equipped. Hazardous waste is defined by the RCRA regulation. Note that a material is not a waste until it's declared such, although time limits exist for storing potential hazardous waste.

**Universal Waste** – This is a subset of RCRA hazardous waste. These items must be recycled. See “EHS Best Practice – Managing Universal Waste.” The five Federal universal wastes are listed in 40 CFR 273 and are also listed as follows. States may add or remove universal wastes from this list: Batteries, certain pesticides, mercury-containing equipment, lamps (i.e. light bulbs), and aerosol cans.

**Maintenance, Construction, and Demolition Debris** - Asphalt, concrete, scrap metal, soil, chemicals brought on-site by the contractor resulting in waste generation (e.g. cleaner, degreaser, solvents).

**Other Routine Debris from a Facility** – Process waste, empty drums, scrap pallets, office paper, electronic waste, asbestos.

The Environmental Department should always be contacted prior to the generation of any wastes on a job for assistance in determining the classification of the wastes to be generated and the proper handling and disposal method.

#### Waste Reduction Techniques

##### **Prevent from Generating Waste in the First Place (Source Reduction)**

Good Housekeeping – prevent leaks and have spill catchment trays in leak prone areas.

When taking process samples, the sample stream is usually allowed to flow for a period of time to ensure that the sample is representative. Ensure that this excess material is collected and returned to the process.

Inadvertent mixing/reaction of chemicals on-site may result in waste generated. Prevent misdirected flows through procedures, independent verification, and good incident investigations corrective actions.

Review chemicals brought on-site by contractors. Hazardous waste generated on plant property by a contractor is counted as waste for the plant, and the plant is responsible for its disposal. There may be alternatives to the chemicals being used to minimize hazardous waste generated.

Consider alternatives to sandblasting, such as soda blasting or dry ice blasting.



Have a new chemical approval process that includes an environmental review. Look for chemical alternatives that have fewer hazardous constituents. Sometimes the chemical with the lowest purchase price will not have the lowest life cycle cost.

Adopt a First In/First Out inventory policy for raw materials to prevent incidents of aged materials becoming waste.

Raw materials no longer needed - Prior to declaring a waste, look for opportunities to return the material to the supplier, or see if there are other locations within your company that can use this material.

### **Reuse Material In Lieu of Disposal**

Off-specification products - Prior to declaring these materials waste, determine if these materials can be sold, reworked, or reclaimed.

Look for commercial uses to a process's waste streams.

### **Recycle**

Recycling is relatively straightforward to implement for universal waste, office paper, electronic waste, used oil, and construction debris (concrete, asphalt, scrap metal). It will likely take more effort to recycle pallets and drums, particularly since they will need to be free of chemical contamination and drums will need to be clean beyond RCRA-empty which allows for some residue.

Recycling of chemical waste can consist of:

- Burned for energy recovery,
- Reclaimed, and
- Timely and legitimate accumulation for future reclamation.

Note that if the chemical waste meets the definition of hazardous waste, the above recycling methods, while good for waste minimization, will still result in the recyclable chemicals being counted as hazardous waste generated. See the "Recycling Table" at 40 CFR 261.2, Table 1 to determine if the chemical waste is to be counted as hazardous waste.

### Storage Requirements

Once waste is generated, its waste status must be determined, e.g. hazardous or non-hazardous and specific hazards associated with each. Document not only hazardous waste determinations as required by RCRA but for non-hazardous waste determinations as well. Retain these records forever, not just the three years specified in RCRA.

Ensure waste is labeled and stored in the proper location. Time limits for storage exist for hazardous waste. Although routine inspections are required for hazardous waste storage areas,



best practice is to have similar inspection protocols for all waste areas. Inspections should be weekly and include the following items:

- Signage
- Proper labeling
- Containers that are closed and in good condition
- Housekeeping
- Evidence of spillage/leakage
- Sufficient aisle space
- Include an inventory with each inspection
- Ensure no unauthorized materials or waste are being stored

### Shipments

Retain manifests indefinitely.

### Training

Train all employees initially and annually thereafter on proper waste storage and handling techniques. Make it easy for them to put the right material in the right place. Training should include identifying wastes and recyclables at the site, where each type of material should be stored, labeling, and consequences of unauthorized mixing wastes. Emergency response training for spills should also be performed, see “EHS Best Practice- Spill Planning Reporting and Response.” An individual’s role in responding to a spill will depend upon their level of training. Handlers of hazardous waste will also need DOT General Awareness, Security, and Function Specific training on a three year frequency as detailed in 49 CFR 172.174.

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