

Using Total Quality Management To Address Waste

ICI Pharmaceuticals Apply the Four "R's"

It is a basic fact of nature that most, if not all processes, generate some waste. Some wastes can be beneficial, such as oxygen given off by plants during photosynthesis, while other wastes may be harmful, such as lead in the exhaust of leaded petrol driven cars.

Industrial processes are no different and can generate diverse and sometimes unwanted wastes. This article will describe for the reader the typical wastes that are generated by a pharmaceuticals company such as ours and how we manage this waste.

At our factory in Villawood we formulate and package a range of prescription tablets, hospital antiseptics and sunscreen products.

Ten years ago waste management was part of the business strategies but, it would be fair to say, did not demand the same attention or priority as it now commands.

What drove this change in importance? The increased managerial awareness of, and commitment to, improved waste management came from several internal and external drivers, such as:

- ICI global commitment to 50% reduction of both hazardous and non-hazardous waste by all businesses by 1995 over 1990;
- better understanding of our waste streams and their characteristics;
- increased community awareness of environmental issues and an expectation that their local industries would not pollute the environment and control their waste;
- International ICI Standards regarding environmental protection;
- requirement to comply with stringent Environmental Protection Agency (EPA) and Water Board licences and permits;
- improvements in waste reduction and recycling strategies in the marketplace and trade waste (sewer) technologies;
- an understanding by all employees as to environmental issues impacting



Entrance to ICI Pharmaceuticals Villawood

on the site and how they can assist with process improvements so that wastage at all points of the manufacturing process can be reduced.

The main types of waste generated at the manufacturing plant at Villawood are:

- **Liquids & Creams** – essential non-hazardous materials caught in damaged packaging, rejected materials and water that has been used to wash out vessels in preparation for the next product to be made;
- **Tablet Waste** – small amounts of materials generated at start up of a batch that could not be reworked and tablets returned from Wholesalers that are out of date or damaged;
- **Drums** – plastic, metal and cardboard used to hold new materials;
- **Paper** – primarily generated from the office areas etc;
- **Cardboard** – shippers that cannot be reused or recycled and damaged product packaging;
- **Plastic** – a variety of plastics, such as shrinkwrap from inward goods, damaged product trays etc;

- **General Refuse** – food scraps, lawn clippings, etc;
- Using Total Quality Management principles and applying the four "R's" of waste management.

- Remove
- Reduce
- Reuse
- Recycle

managers and their teams have made, and continue to make, improvements in the process with the resulting improvements in productivity, cost reductions and waste reductions.

Significant improvements have occurred in the area of trade waste. From 1990 to 1994 the following reductions were achieved: Total grease 3.5 tonne to 0.27 tonne; Biological/Oxygen Demand (BOD) 3.7 tonne to 2.2 tonne; Sulphates 50 tonne to less than 1 tonne and suspended solids from 2 tonne to 0.3 tonne.

The only waste gas emitted to air is carbon dioxide which results from burning natural gas in our boiler to produce process steam. By upgrading the boiler and better management



Testing done in Lab

energy requirements the CO₂ emission has reduced from 1140 tonne in 1991 to 760 tonne in 1994.

Some paper and most cardboard waste is recycled. Plastic waste has proven to be a challenge to recycle as it is primarily shrinkwrap and the recycling industries are still developing technologies to deal with this type of plastic.

All metal and plastic drums are sent for reconditioning and recycling. There is limited demand for cardboard kegs for recycling and some are subsequently crushed and sent to landfill.

Solid waste such as tablet waste cannot be sent to landfill and is sent for incineration.

Most other waste is sent to landfill at present, but the business is keen to further reduce this requirement as it is recognised that the landfill option will become more restricted and expensive.

It is believed by the business that efforts now need to be concentrated in firstly removing or improving those processes that generate waste and, if generated, identify new recycling options.

Recycling options get better as new

technologies and markets are developed.

The area of "reuse" is limited because of the requirements and restrictions of the "Code of Good Manufacturing Practice".

The business is justifiably proud of its waste management programme and its compliance with both internal and external environmental standards.

The manufacturing plant at Villawood was one of the first businesses within ICI Australia to undertake an Environmental Disclosure to the community in 1993 with a follow up in 1994 during the ACIC "OPEN DOOR" Day on 26 March.

We believe the keys to good waste management are:

- clear understanding of how the processes generated the waste and why it occurs;
- characterising and quantifying the different types of waste generated;
- having a process of Continuous Improvement operating;
- involvement of those people who work with the process;
- sound strategies in place to manage the waste according to the four "Rs".

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