ENGINEERING CONTROL EQUIPMENT

From April 1948 to January 1966, 66,756 permits for basic and control equipment were issued by the Los Angeles County Air Pollution Control District. During this same period of time, the Air Pollution Control District denied 5457 applications for basic and control equipmnet valued at $526,655,000. The approximately 12,000 air pollution control devices installed in industrial plants vary widely in cost and collection efficiency. The principal types used in the engineering control program included electrical, precipitators, baghouses, fume burners, centrifugal collectors, scrubbers and washers, vapor collection equipment, absorbers and adsorbers.

Electrical Precipitators separate and collect particulate matter from dirt-laden gas streams. The control device contains oppositely charged, high voltage plates and wires. The solid materials in the gas stream are given an electrical charge by the wires, and then are attracted to the oppositely charged plates. Periodically, the particulate matter deposited on the plates are "rapped" or washed off and collected for harmless disposal.

Baghouses collect particulate matter, and function much like the household vacuum cleaner. They contain a number of tubular bags made of glass fiber, felt, or similar material. Dirt-laden gas streams are vented to baghouses through inlet headers, which distribute the gas under pressure into the tubular cloth bags. The gas passes through the cloth, while the aerosol contaminants are filtered out and retained on the cloth. The filtered aerosols are removed from the bags by periodically stopping the gas flow and shaking the bags or jetting air back through the bags, allowing the material to be collected in hoppers and the bags to be restored to operating efficiency.

Fume Burners incinerate the combustible materials contained in a waste gas stream. These devices consist of a refractory-lined shell equipped with one or more natural gas burners. Sufficient time and temperature are most important factors in the ultimate efficiency of such devices.

Other Collectors and Separators commonly used to collect solid materials are cyclone separators and settling chambers. Cyclone separators employ the principle of centrifugal force to throw the solids out of the swirling gas stream, and function much like a cream separator. Settling chambers collect large solids by slowing the gas stream to permit heavy particles to settle out.

Scrubbers and Washers cleanse particle laden gas streams by use of a spray which strikes the solids and washes them from the gas. Gas also may be bubbled through a liquid bath for cleansing.

Vapor Collection Equipment captures vapors generated during the storage or handling of gasoline and other volatile products. The vapors expelled from storage vessels are conveyed through vent piping to collection equipment such as vaporspheres. The control system may compress and condense the collected vapors back into a liquid state, or may process them for removal by absorbers. In some cases, the vapors can be used to fuel boilers, and in other cases, they are incinerated in fume burners.

Absorbers employ a process in which a liquid dissolves a gas. They may be used to remove selectively one gas from another. Usually, absorbers are cylindrical towers which are packed with an inert material or equipped with trays or plates to increase contact area and efficiency of absorption.

Adsorbers employ a physical process in which the molecules of either a gas or a liquid are captured and held by a solid material. Activated carbon is a common adsorbent and has a large surface area available in the form of many very small capillaries to capture and hold gas and liquid molecules. The activated carbon very frequently is regenerated by steam which vaporizes the adsorbed material. A condenser returns the steam and adsorbed material to the liquid state.

CONTROL PROGRAM ACHIEVEMENTS

Each type of device possesses its own advantages and limitations. Each source poses different problems in terms of the volume, temperature, and characteristics of the waste emitted from it. In effect, a solution must be tailored to the source. The degree of control which a community requires will dictate, in the main, which type of control will be utilized and the cost of the control system. Concrete examples of contaminant emission reducing actions, many employing