

the preceding devices, that have been effective in the Los Angeles County Air Pollution Control District's control program can be pointed out in almost every industrial activity.

Large crude oil tanks at petroleum pipeline tank farms and marine terminals are equipped with vapor controls, such as floating roofs. Wet gas from production fields is collected and processed in natural gasoline absorption plants and dry gas is compressed, where necessary, and sold or used as fuel. Vented thermal dehydrators have been replaced with electrical dehydrators to reduce hydrocarbons emitted through greater evaporation at the elevated temperatures.

Vapor emissions from petroleum distillate storage tanks have been curbed through enforcement of Rule 56, enacted in 1953. The first control measure of its type anywhere, this rule specified that all tanks greater than 40,000 gallons in capacity must be controlled when used for the storage of a petroleum distillate having a vapor pressure of 1.5 pounds per square inch absolute or greater. This one rule has resulted in a reduction of hydrocarbon vapor emissions of approximately 355 tons per day.

Attempts to control oil-effluent water separators began in 1953 and became effective with the enactment of Rule 59 in 1955. This rule prevents the emission of malodors and approximately 105 tons per day of hydrocarbons. Compliance with the rule is 100 per cent and, so far as is known, this is the only area of the United States in which controls for separators are required.

Visible evidence of technical progress in air pollution control in the petroleum industry is provided by the replacement or conversion of conventional flares to smokeless-type flares. One type of smokeless flare uses steam injection, another uses a series of venturi burners actuated individually or in groups by pressure increments. Since 1956, the operating controls of steam-injected refinery flares have been elaborated in an effort to make them capable of handling without smoking the largest release of vapors expected, even during disaster conditions.

Fluid catalytic cracking presents an air pollution problem because of the discharge of visible plumes, carbon monoxide, catalyst dust, hydrocarbons, and other air contaminants. In Los Angeles County, all fluid catalytic cracking units are equipped with approved dust collection equipment, such as electric precipitators, to control the catalyst dust. In addition, carbon monoxide waste heat boilers effectively and economically control discharges of hydrocarbons, carbon monoxide and plumes from these units.

Because of the limitations imposed by regulations of the District, and through the modernization of the refinery and petrochemical units, continued air pollution control improvement for process equipment has been realized. The last major vacuum jet discharge into the atmosphere in this area was controlled by incinerating the effluent vapors in a heater firebox. An estimated 450 pounds per day of hydrocarbon vapors from this one jet are now being used as a source of fuel. Mechanical seals on centrifugal pumps, manifolds for emergency relief systems to smokeless-type refinery flares, sealed drains, and controlled shutdown and startup procedures have further decreased the hydrocarbon emissions from such manufacturing operations.

Rule 61, which was adopted in 1956, requires that the hydrocarbon vapors displaced from tank trucks during their loading with large volumes of gasoline be collected and disposed of in an approved system. Approximately 50 tons per day of hydrocarbons now are prevented from being discharged into the atmosphere during loading operations by this rule. This is a savings to the industry. Gasoline loading is controlled in no other area and, in fact, the control technology was developed locally.

An additional 14 tons per day of hydrocarbons are prevented from entering the atmosphere by control of the filling of underground gasoline storage tanks from tank trucks, mostly in gasoline service stations. Rule 65, adopted in April 1964, prohibits the loading of gasoline into a stationary tank with a capacity of 250 gallons or more unless through a permanent submerged fill pipe, or unless the tank is equipped as specified in Rule 56.

The control of sulfur dioxide was one of the first major programs undertaken by the District after its formation in 1947. One of the first successful phases of this effort involved the control of sulfur dioxide from sulfuric acid plants, all of which now are operating in compliance with Rule 53a. This rule limits the concentration of sulfur dioxide in the effluent gases to a maximum concentration of 0.2 per cent by volume.