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HYDROCARBON EMISSIONS FROM REFINERIES

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Committee on Refinery Environmental Control

AMERICAN PETROLEUM INSTITUTE

Washington, D.C.

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Introduction

At the 1971 Fall Meeting of the API Committee on Refinery Environmental Control, it was decided to set up a special task force to develop and evaluate cost-benefit relationships involved in the control of hydrocarbon emissions. This report present the results of their study.

The report evaluates the major sources of hydrocarbon emissions from refineries as listed in Table 1. Miscellaneous sources were not evaluated, but have been briefly discussed at the end of the report.

Costs of methods and facilities for reducing hydrocarbon losses were developed. Methods for determination of hydrocarbon losses from various facilities available from literature sources such as API Bulletins 2512 and 2520, inclusive, and the U. S. Government publication "Air Pollution Engineering Manual," No. 99-AP-40, have been summarized and utilized.

To illustrate the evaluation of cost-benefit relationships, a "typical" 100,000 barrel per day refinery that had few or no provisions for control of hydrocarbon losses was assumed and evaluated. The sources of hydrocarbon losses were quantified; the benefits and costs of applicable methods of control estimated, and the resulting cost effectiveness or cost-benefits determined.

The term "hydrocarbon" as used in this report refers to the total vapor phase hydrocarbons, including straight chain, saturated and unsaturated, aromatics, aldehydes, and organic acids. The volatile hydrocarbon components can be measured by means of a gas chromatograph. The use of flame ionization detection devices in connection with a gas chromatograph results in sensitivities as low as 0.20 ppm (vol.) and will respond to almost all organic substances, but not to inorganic compounds. This report does not cover petrochemical emissions, for which the reader is referred to API Bulletin 2523 and also excludes coke particulate fines.

It was assumed that the "typical" refinery observes good housekeeping practices and performs adequate equipment inspection and maintenance. The importance of good housekeeping and maintenance cannot be overemphasized and is essential to safety and minimizing oil and vapor losses.

Task Force

Warren J. Grant, Chairman
Carl Heinrich
Edward L. Hoffman
John Skurla

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