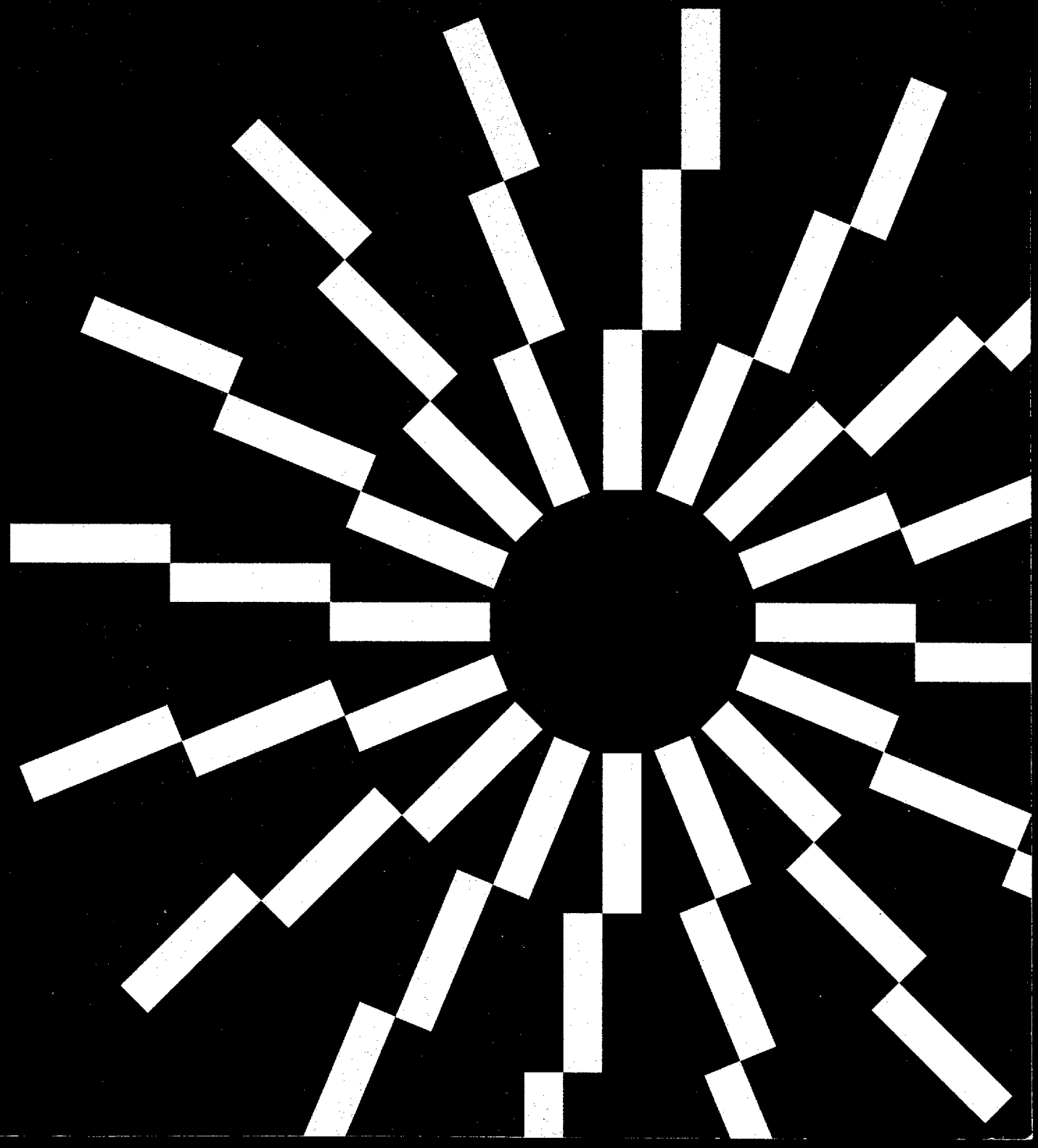
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Development of Fugitive Emission Factors and Emission Profiles for Petroleum Marketing Terminals

Volume I: Text

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Development of Fugitive Emission Factors and Emission Profiles for Petroleum Marketing Terminals

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API STAFF CONTACTS

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Karin Ritter, Health and Environmental Affairs

MEMBERS OF THE AIR TOXICS MULTIYEAR STUDY WORKGROUP

Kathy Kelly, Shell Oil Company
Lee Gilmore, Texaco
Richard Russell, API consultant
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ABSTRACT

The American Petroleum Institute (API) commissioned this study to "Develop Fugitive Emission Factors and Emission Profiles for Petroleum Marketing Terminals" by screening and/or bagging components at three marketing terminals. The United States Environmental Protection Agency (U.S. EPA) separately funded the same test contractor (Radian) to test an additional terminal. The results for all four marketing terminals are presented in this report.

New average emission factors, new default zero emission factors, and new emission correlation equations were developed for the majority of the component types found in petroleum marketing terminals. In almost all cases the new average emission factors, new default zero emission factors and new emission correlation equations predict substantially lower emissions than those factors and equations determined in previous studies of the chemical and petroleum refinery industries. These emission factors are lower because of lower leak distributions and lower correlations between mass emissions and screening values.

In addition to screening and bagging, a test was performed to determine the quantities of liquid gasoline that leaked out of loading arms after filling the gasoline tank trucks. These drips occur immediately after the trucks have been loaded and the liquid loading arms released from the trucks. In almost all cases the measured drip volumes per loading arm were below the detection limit of the measuring instrument (0.1 mL per truck loading event), indicating that these drips result in minimal emissions.

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EXECUTIVE SUMMARY

The American Petroleum Institute (API) commissioned this study to "Develop Fugitive Emission Factors and Emission Profiles for Petroleum Marketing Terminals" by screening and/or bagging components at three marketing terminals. The United States Environmental Protection Agency (U.S. EPA) separately funded the same test contractor (Radian) to test an additional terminal. The results for all four marketing terminals are presented in this report. The study's main objective was to:

- Determine emission factors and fugitive emission correlation equations for components (e.g., valves, pumps, etc.) in light liquid and gas services[1] specifically related to the petroleum marketing terminals.[2]

The secondary objectives were to:

- Develop correlations between chemical composition of the liquids in the lines and the chemical composition of the fugitive emissions.
- Compare the physical characteristics of the petroleum marketing terminals and the effect of these characteristics on the levels of fugitive emissions.

In this study, components analyzed for fugitive emissions were:

- Valves (ball, plug, butterfly, gate, check, diaphragm, globe, etc.).
- Connectors (flanges, screwed connectors, tubing connectors, union connectors, etc.).
- Pumps (centrifugal).
- Open-ended lines.

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[1] Gas service in this study is defined as the vapor phase of the liquid product.

[2] The U.S. EPA's primary objective was the development of emission correlation equations and stratified emission factors (but not average emission factors) specific to marketing terminals.