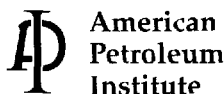


IMPACTS OF PETROLEUM PRODUCT MARKETING TERMINALS ON THE AQUATIC ENVIRONMENT

HEALTH AND ENVIRONMENTAL SCIENCES DEPARTMENT
PUBLICATION NUMBER 4673
APRIL 1999



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- To promote these principles and practices by sharing experiences and offering assistance to others who produce, handle, use, transport or dispose of similar raw materials, petroleum products and wastes.

Impacts of Petroleum Product Marketing Terminals on the Aquatic Environment

Health and Environmental Sciences Department

API PUBLICATION NUMBER 4673

PREPARED UNDER CONTRACT BY:

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PREFACE

The American Petroleum Institute (API), through its Water Technology Task Force, has been conducting a multi-year program to evaluate and identify practical and environmentally sound technology options for handling and treating waters generated at petroleum product distribution terminals. The results of this program are intended to provide industry and regulatory agencies with technical information to make informed decisions on appropriate alternatives for individual terminal facilities.

The Task Force has sponsored and published a significant amount of work in prior years on handling and treating terminal waters. A listing of some key published reports and guidance documents is provided below. The material in this informational paper is intended to put the results of these technical studies into perspective by comparing treated water discharges at petroleum terminals with common household products and wastes. Also, the paper provides a technical analysis of water discharges on the aquatic environment using EPA water quality criteria and other assessment approaches, plus gives definitions that allow the public to understand technical terminology.

Studies Sponsored by the Water Technology Task Force

- Publ 4665 Analysis and Reduction of Toxicity in Biologically Treated Petroleum Product Terminal Tank Bottoms Water, April 1998
- Publ 4664 Mixing Zone Modeling and Dilution Analysis for Water-Quality-Based NPDES Permit Limits, April 1998
- Publ 4655 Field Evaluation of Biological and Non-Biological Treatment Technologies to Remove MTBE/Oxygenates from Petroleum Product Terminal Wastewaters, August 1997
- Publ 1612 Guidance Document for Discharging of Petroleum Distribution Terminal Effluents to Publicly Owned Treatment Works, November 1996
- Publ 4602 Minimization, Handling, Treatment and Disposal of Petroleum Products Terminal Wastewaters, September 1994
- Publ 4606 Source Control and Treatment of Contaminants Found in Petroleum Product Terminal Tank Bottoms, August 1994
- Publ 4582 Comparative Evaluation of Biological Treatment of Petroleum Product Terminal Wastewater by the Sequencing Batch Reactor Process and the Rotating Biological Contactor Process, June 1993

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Publ 4581 Evaluation of Technologies for the Treatment of Petroleum Product
Terminal Wastewater, June 1993

The assessment made in this study shows that petroleum terminal discharges do not have much of an impact on the aquatic environment. In most situations, the waters contain *de minimus* amounts of contamination, since much effort is taken by terminals to segregate contaminated water from those waters, such as stormwater, that are minimally contaminated. In many cases, the more highly contaminated waters from petroleum product distribution terminals are returned to refineries for oil recovery and recycling. Prior studies sponsored by the Task Force have shown that operations and water characteristics at distribution terminals can vary significantly as to regulatory requirements in different geographical jurisdictions. Hence, it is recommended that the reader carefully consider site-specific terminal water characteristics and regulatory requirements before drawing any conclusions about the aquatic impact of any given petroleum product distribution terminal.

The Task Force greatly acknowledges and appreciates the fine work performed by Exxon Biomedical Sciences, Inc., East Millstone, NJ, in performing this assessment.

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EXECUTIVE SUMMARY

This document examines the potential impact of petroleum product marketing terminal (PPMT) wastewater discharges to aquatic environments to ascertain whether a need exists for more stringent regulations.

Stringent water quality regulations prevent wastewater discharges that produce unacceptable risks to human health or the environment. However, these regulations are now being applied to small and intermittent dischargers, such as PPMTs, that pose little if any risk to human health or the environment. PPMTs do not discharge large volumes of wastewater or large amounts of contaminants. PPMT effluent is primarily from rainfall. Sometimes, PPMTs also discharge water from product storage tanks, but only after it has been treated to remove contaminants.

Wastewaters discharged by PPMTs were evaluated in this report. The constituents normally present in these waste streams were identified and their possible aquatic impacts were investigated. This was done by comparing published U.S. EPA water quality criteria for the individual constituents with the calculated in-stream concentrations of these constituents after assimilation of PPMT effluent into a small volume of the receiving stream referred to as a mixing zone. Using very conservative assumptions, all of the constituent concentrations were less than the strictest published U.S. EPA criteria. Therefore, adverse aquatic impacts due to normal PPMT discharges of these constituents may be considered unlikely.

PPMT wastewater discharges pose little environmental risk. Cost-effective environmental benefits will not result from requiring PPMTs to incur significant costs to comply with stringent regulations designed for other industrial effluents which pose more substantive environmental risks. Stricter regulations for PPMT discharges are unwarranted.

Section 1 INTRODUCTION

Rapid growth of population and industrialization significantly altered the U.S.'s aquatic environments by the mid 20th century. At that time, the discharge of large quantities of untreated or poorly treated wastewaters often exceeded the receiving stream's capacity to assimilate or detoxify contaminants contained in those wastewaters. As a result, populations of many aquatic organisms were reduced or completely eliminated in sections of many water bodies.

Consequently, by the early 1970s the Environmental Protection Agency (EPA), state, and local environmental regulatory agencies began developing and implementing comprehensive regulations to improve the quality of the nation's aquatic environments. These regulations were primarily intended to improve the quality of effluents discharged by large industrial and municipal wastewater dischargers. Improvements in effluent quality were directly achieved by implementing aggressive treatment programs to remove effluent contaminants. As a result, water quality has shown marked improvement during the last two decades.

However, regulations continue to evolve on national, state and local levels. New, strict regulations require increased effluent treatment and contaminant monitoring to ensure compliance. In some instances, there is no treatment technology currently available to meet the proposed regulations. Consequently, expensive research and development programs have developed, and continue to develop, new cost-effective treatment options.

In some situations, dischargers may or may not have to monitor or treat for a particular contaminant depending on the location in which the discharger operates. Due to differences in state and local environmental laws, discharge permit requirements vary among locations.

Increasingly stringent regulations are being applied to small and intermittent dischargers, such as petroleum product marketing terminals (PPMTs). Unnecessary monitoring and treatment may be required at some locations despite the good quality and intermittent low volume of wastewater

discharged by PPMTs. This additional cost is unjustified if discharge of the untreated wastewater will not result in undue risk to human health, or to the aquatic environment to which the wastewater is to be discharged. This paper presents a brief overview of PPMT facilities and products; and reviews the sources, quantity and quality of PPMT wastewater streams. It also examines the potential impact of PPMT wastewater discharges to aquatic environments, to ascertain whether a need exists for more stringent regulations and treatment requirements.