Design of Secondary Containment in Petrochemical Facilities

Task Committee on Secondary Containment

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Design of Secondary Containment in Petrochemical Facilities

Prepared by the TASK COMMITTEE SECONDARY CONTAINMENT of the PETROCHEMICAL COMMITTEE of the ENERGY DIVISION of the AMERICAN SOCIETY OF CIVIL ENGINEERS



Abstract:

Current codes and standards do not address many of the structures found in the petrochemical industry. A task committee was established because of a significant interest in the petrochemical industry in dealing with environmental issues and in interpreting and complying with government environmental standards. The purpose of this task committee report is to help provide some uniformity to the current mix of internal and published criteria, and provide guidance in design of secondary containments. Though the makeup of the committee and the writing of this document are directed at petrochemical facilities, these guidelines are applicable to similar design structures in other industries.

Library of Congress Cataloging-in-Publication Data

Design of secondary containment in petrochemical facilities *I* prepared by the Task Committee on Secondary Containment of the Petrochemical Committee of the Energy Division of the American Society of Civil Engineers.

p. cm. ISBN 0-7844-0263-9

 1. Petroleum refineries--Design and construction. 2. Petroleum refineries--Safety measures. 3. Petroleum chemicals--Storage. 1. American Society of Civil Engineers. Task Committee on Secondary Containment. TH4571.D474 1997

 97-20917
 97-20917

 65.57380--dc2 1
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ASCE Petrochemical Energy Committee

This publication is one of five state-of-the-practice engineering reports produced, to date, by the ASCE Petrochemical Energy Committee. These engineering reports are intended to be a summary of current engineering knowledge and design practice, and present guidelines for the design of petrochemical facilities. They represent a consensus opinion of task committee members active in their development. These five ASCE engineering reports are:

- 1) Design of Anchor Bolts in Petrochemical Facilities
- 2) Design of Blast Resistant Buildings in Petrochemical Facilities
- 3) Design of Secondary Containment in Petrochemical Facilities
- 4) Guidelines for Seismic Evaluation and Design of Petrochemical Facilities
- 5) Wind Loads on Petrochemical Facilities

The ASCE Petrochemical Energy Committee was organized by A. K. Gupta in 1991 and initially chaired by Curley Turner. Under their leadership, the five task committees were formed. More recently, this committee has been chaired by Joseph A. Bohinsky, followed by Frank J. Hsiu.

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The ASCE Task Committee On Secondary Containment

The purpose of this document is to provide a guideline for secondary containment design in Petrochemical Facilities. This document is a summary of current practice for the Petrochemical Facilities in compliance with the latest regulations. Another purpose of these guidelines is to provide some uniformity in design and practice for secondary containment structures, and to show state of the art. Even though this document was prepared for use at Petrochemical Facilities, the guidelines are applicable for all similar facilities.

These documents do not determine for the user when secondary containment is required. They only give the user some methods for providing secondary containment. Due to the rapid rate of changes in the field, and the length of time taken to publish a document, new materials and methods for providing secondary containment may be available, and may be more cost effective than those shown. The methods shown have proven to be effective, and can be constructed in the field.

These documents were developed over the course of three years. The governing regulations are constantly being updated and revised. These documents are not intended to be a design manual, code or standard. They represent a consensus opinion of several internal company standard practices, published documents, and an interpretation of the current regulations by the committee members. Any findings, conclusions or recommendations expressed in these documents are those of the authors and do not necessarily reflect the views of ASCE or the authors' respective organizations.

The ASCE Task Committee on Secondary Containment

In helping to create a consensus set of guidelines, a number of key individuals dedicated significant amounts of time to formulating, writing, and reviewing in detail, specific sections of this document. Those members are identified on the list of committee members and contributors.

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CHAPTER 1 INTRODUCTION

This document was prepared to provide guidance to civil engineers in the design of secondary containment for petrochemical facilities.

The guidelines provided are based on the current practice for petrochemical facilities and are in compliance with the latest governing regulations.

This document covers several areas in petrochemical facilities that may require secondary containment. It is the responsibility of the design civil engineer, with input from the environmental engineer and others in the regulatory agencies, to determine if secondary containment is required for each area in the petrochemical facility.

In preparing this document, the objective was to provide guidelines for the major areas in the petrochemical facility such as storage tanks, sumps, piping, and loading and unloading areas. It is recognized that there will be some areas not fully covered. However, the design engineer will be able to adopt the guidelines discussed in this document to design secondary containment systems for those areas not covered herein.

1.1 BACKGROUND

New governing environmental regulations require the petrochemical industry to provide secondary containment with a leak detection system. The design engineer is faced with new requirements to incorporate into the design of petrochemical plants and has to rely on personal interpretation of the regulations to determine the required design.