*FM 5-482

Field Manual
No. 5-482

Headquarters
Department of the Army
Washington, DC, 26 August 1994

MILITARY PETROLEUM PIPELINE SYSTEMS

Contents

*This publication supersedes TM 5-343, 20 February 1969.

Page

Chapter Two. Equipment

Chapter Three. Planning for Bulk-Fuel Distribution

Page

Chapter Four. Design

Page

Chapter Five. Construction

Page

Chapter Six. Maintenance and Repair

Chapter Seven. Bulk-Fuel Storage Facilities

Page

Appendix A. Formulas

Appendix B. Steel Pipeline Systems

Appendix C. Pump Curves and Design Charts

List of Figures

Page

Page

Page

List of Tables

PREFACE

Purpose

This manual provides the fundamentals of planning and construction of military petroleum pipelines. The manual also provides detailed information for construction personnel on the installation and repair of military pipeline systems. It delineates unit responsibilities, whenever possible, due to the large number of units with specialized skills required to establish a bulk-fuel distribution system.

Scope and Applicability

This manual can be used by any planner at company level and above. However, it was developed primarily for engineer commanders and staffs to design petroleum pipeline distribution systems. Use of this manual is also applicable to quartermaster commanders and staff for the operation of these bulk Class III systems.

The proponent for this publication is HQ, TRADOC. Submit changes for improving this publication on Department of the Army (DA) Form 2028 (Recommended Changes to Publications and Blank Forms) and forward it to Commandant, US Army Engineer School, ATTN: ATSE-T-PD-PM, Fort Leonard Wood, MO 65473-6650.

The provisions of this publication are the subject of international agreement STANAG 2115 LOG (Edition 4), *Fuel Consumption Unit.*

Unless otherwise stated, masculine nouns and pronouns do not refer exclusively to men.

DANGER

Suspend all handling of the pipeline system when an electrical storm is within a 5-mile radius of your operation, during high winds, or when your commander notifies you.

Chapter One. Bulk-Fuel Distribution System

This chapter implements STANAG 2115 LOG (Edition 4).

1-1. Introduction.

a. *The Distribution System.* The military's ability to move and fight depends on its fuel supply. In modern warfare, bulk petroleum makes up over 70 percent of the tonnage moved in the theater of operations (TO). The availability of fuel depends on the location of the TO. In industrialized areas, initial supplies could be obtained locally. Tankers will bring in subsequent supplies. Major portions of the distribution system, such as storage tanks, may already be in place. The existing system may have to be renovated or supplemented with coupled pipelines, hose lines, and temporary storage tanks. In undeveloped areas, tankers bring in initial fuel supplies. The Army supplies its own distribution system. The quartermaster petroleum group is responsible for the supply and distribution of bulk fuel in a TO.

A bulk-petroleum distribution system is the network that gets bulk fuel to using units. The system can consist of ocean-tanker loading and unloading facilities, storage terminals, pump stations, pipelines, hose lines, Class III supply points, tank vehicles, and rail tank cars. In an undeveloped TO, the bulk-petroleum distributions system (Figure 1-1, page 1-2) consists of tactical petroleum terminals (TPTs), hose lines, fuel-system supply points (FSSPs), and tank vehicles. In a developed TO, the same items mentioned above normally consist of fixed facilities (Figure 1-2, page 1-3). Pipelines are used as far forward as the corps' rear area. The rest of the system in the corps and division areas consists of portable facilities.

The basic petroleum-operating concept is to keep storage tanks full at all times. The schedule for fuel movement through the system is based on storage capacity and product demand. Constant communication between the distribution and storage facilities is essential during construction and operation of the system. For more information, see FMs 10-18 and 10-67.

(1) In an Undeveloped TO. Bulk fuels are received in the undeveloped TO in over-the-beach operations using TPTs. Hose lines or coupled pipelines initially carry the products inland, and the Army transports the fuels to the ground forces, where possible. Coastal tankers may be used to move products from deep draft tankers to moorings in waters too shallow for larger ships. Bulk fuel is transferred by flexible hose lines to tank farms, which are made up of steel or collapsible, fabric storage tanks. The petroleum supply system in an undeveloped TO includes tanker mooring facilities, floating hose lines, submarine pipelines, and inland tank farms and terminals that use hose lines and collapsible tanks. The system also includes pump stations, flexible hose lines, coupled pipelines, and tank vehicles. Bulk fuel is moved from base terminals and rear storage locations to the combat zone, using flexible hose lines.

Coupled pipelines are used when the beachhead is expanded. Initially, tactical air bases are connected to the main hose line or pipeline and to the appropriate tank farm by hose line. The