FUGITIVE DUST CONTROL TECHNOLOGY

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Foreword

This book, a study by the Ohio Environmental Protection Agency and PEDCo Environmental, Inc., was prepared to assist industry in identifying sources of fugitive dust emissions and available control measures for such sources. Detailed data are presented for 30 industrial categories.

Widespread failure to attain prescribed air quality standards for particulate matter in many urban areas has resulted in re-examination of the nature of the urban particulate problem. Less conventional sources of particulates such as industrial process fugitive emissions, and general fugitive dust emission sources such as materials handling operations, storage piles, unpaved roads and parking lots, must now be considered.

This book provides data on potential fugitive dust problems and available means to alleviate these problems. The information given for the 30 industrial categories includes process descriptions; identification of fugitive dust sources; a listing of available fugitive dust emission factors; data on particle characteristics and potential adverse impacts; details of available control techniques, their effectiveness, and costs; and a selection of reasonably available control measures for each emission source. Sample calculations are also included for most categories with cost data adjusted to 1980 dollars.

While the book was written for the state of Ohio, its applications are nationwide and the book will be of interest to anyone involved with environmental management.

The information in the book is from *Reasonably Available Control Measures for Fugitive Dust Sources* (NTIS Report PB82 103805), prepared by J.A. Orlemann, T.J. Kalman, J.A. Cummings and E.Y. Lim of Ohio Environmental Protection Agency, Office of Air Pollution Control; and G.A. Jutze, J.M. Zoller, J.A. Wunderle, J.L. Zieleniewski, L.L. Gibbs, D.J. Loudin, E.A. Pfetzing, and L.J. Ungers of PEDCo Environmental, Inc., September 1980.

The table of contents is organized in such a way as to serve as a subject index and provides easy access to the information contained in the book.

Advanced composition and production methods developed by Noyes Data are employed to bring this durably bound book to you in a minimum of time. Special techniques are used to close the gap between "manuscript" and "completed book." In order to keep the price of the book to a reasonable level, it has been partially reproduced by photo-offset directly from the original report and the cost saving passed on to the reader. Due to this method of publishing, certain portions of the book may be less legible than desired.

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The Office of Air Pollution Control (OAPC) project team extends its sincere appreciation to the many individuals and organizations that participated in the development of this document. The participants included representatives of industries, associations, private contracting and consulting firms, and federal, state and local air pollution control agencies. Their input and assistance were obtained from responses to the OAPC's initial questionnaire/survey, telephone communications, written comments and plant tours. Because of the large number of participants, it is impossible to acknowledge all of them in this document.

The project team would, however, like to give special recognition to PEDCo Environmental who prepared the drafts for Part 1 and Sections 2.1-2.16. Mr. George A. Jutze served as Project Director, and Mr. John M. Zoller was the Project Manager. The Senior Advisor was Mr. Jack A. Wunderle, and Ms. J.L. Zieleniewski was in charge of Library Resources. Additional authors of the abovementioned draft section of the document were Lawrence L. Gibbs, D.J. Loudin, E.A. Pfetzing and L.J. Ungers.

The OAPC, Division of Engineering project team was responsible for the preparation of the complete, final document. Revisions were made by the project team to the draft sections prepared by PEDCo. In addition, the project team prepared the entirety of Sections 2.17 through 2.30. Mr. James A. Orlemann, Division Chief, served as the Project Officer. He was assisted by Mr. Thomas J. Kalman, Engineering Operations Section Chief, and Mssrs. James A. Cummings and Edwin Y. Lim, Environmental Scientists.

Finally, special recognition is also owed to Mrs. Joyce Scales Ellis, Secretary for the Division of Engineering, for her tremendous work in typing this document.

Contents and Subject Index

Part I

Introduction

In general, all the early State Implementation Plans (SIP's) required by the Federal Clean Air Act (CAA) explicitly and specifically addressed point source control and relied on point source reduction measures as the means of attaining the National Ambient Air Quality Standards (NAAQS) for Total Suspended Particulate (TSP). Control of fugitive dust emissions was only cursorily addressed in these plans--generally in the form of a modified "nuisance" regulation, and was often patterned after the form presented in the Federal Register.

Widespread failure to attain the National Ambient Air Quality Standards for particulate matter in many urban areas has resulted in reexamination of the nature of the urban particulate problem. Basically, the particulate control strategy developed as part of the original SIP's included an analysis of the contribution of conventional point and area sources without much consideration of other "less conventional" sources of particulate such as industrial process fugitive emissions, material handling operations, storage piles, unpaved roads and parking lots, etc.

In light of the significant potential impact of fugitive dust emissions on the levels of suspended particulates in the ambient air, the Ohio Environmental Protection Agency (OEPA) has undertaken a program to prepare guidelines for selection of reasonably available control measures (RACM) for major manufacturing categories.

The purpose of this report is to provide agency personnel with information on industry categories relating to potential fugitive dust problems, and available means to alleviate the problems. In accomplishing this purpose, the guideline presents detailed data on 30 industry categories. The information supplied includes a general process description of the industry; identification of fugitive dust sources; a listing of available fugitive dust emission factors; available data on particle characteristics and potential adverse impacts; data on available

control techniques, their effectiveness, and costs; and selection of RACM for each emission source.

The process description is a general explanation of the process operations in which each potential fugitive emission source is identified. Available emission factors for these sources are listed along with a reliability rating for each. The reliability ratings are indicative of the supportive data used to develop the factor. The following rating system is employed:

A - Excellent - Supportable by a large number of tests, process data, and engineering analysis work.

B - Above average - Supportable by multiple tests, moderate process data, and engineering analysis work.

C - Average - Supportable by multiple tests.

D - Below average - Supportable by limited test data and engineering judgment.

E - Poor - Supportable by best engineering judgment (visual observation, emission tests for similar sources, etc.).

Available data on composition, size range, and potential environmental and/or health effects of the fugitive particles are presented to provide insight into the potential impacts of the fugitive emissions.

For each of the fugitive dust sources identified, available control measures are described. Data on the effectiveness and costs are also included. Costs in the document have been adjusted to reflect 1980 dollars as described in Appendix A. The costs are presented as an order-of-magnitude guide and should not be considered as accurate for a site-specific application.

Of the available control techniques, one is selected that exemplifies RACM. The selection is based upon technological feasibility, economic feasibility, and cost-effectiveness. The selection process was judgmental; and it should be emphasized that for retrofit applications, control characteristics are highly plant-specific and could dictate another control technique as RACM. This document provides guidelines to selecting RACM for various processes and is not meant to preclude consideration of other control measures in site-specific analyses.

Part II

Industrial Control Measures

2.1 General Fugitive Dust Emission Sources

The general fugitive dust category presents a description of those dust sources which would be common to a number of industries. These sources include fugitive dust from 1) plant roadways and parking areas, 2) aggregate storage piles, 3) material handling, and 4) mineral extraction. These four fugit dust sources have been grouped together and treated as a separa section in order to avoid redundancy within the remainder of th text.

The location or placement of a given fugitive dust source will vary greatly within a specific industry. An example of this variability is illustrated by a conveying operation. The conveyor may be located at a number of points within the industr process: unloading of raw material, transport from a storage facility, and movement of material within the industrial process itself. Because of the great variation in placement, it is not possible to devise a typical flow diagram for these sources. However, to give the reader of this document a feel for the possible order and location of each general fugitive dust source two hypothetical industrial settings are provided. Figure 2.1-1 presents a hypothetical flow diagram for an unspecified industry with fugitive dust sources from 1) plant roadways and parking areas, 2) aggregate storage piles, and 3) material handling operations. Figure 2.1-2 presents another hypothetical flow diagram depicting a mineral mining operation. The fugitive dust sources illustrated in this figure are common to mineral extracti operations.

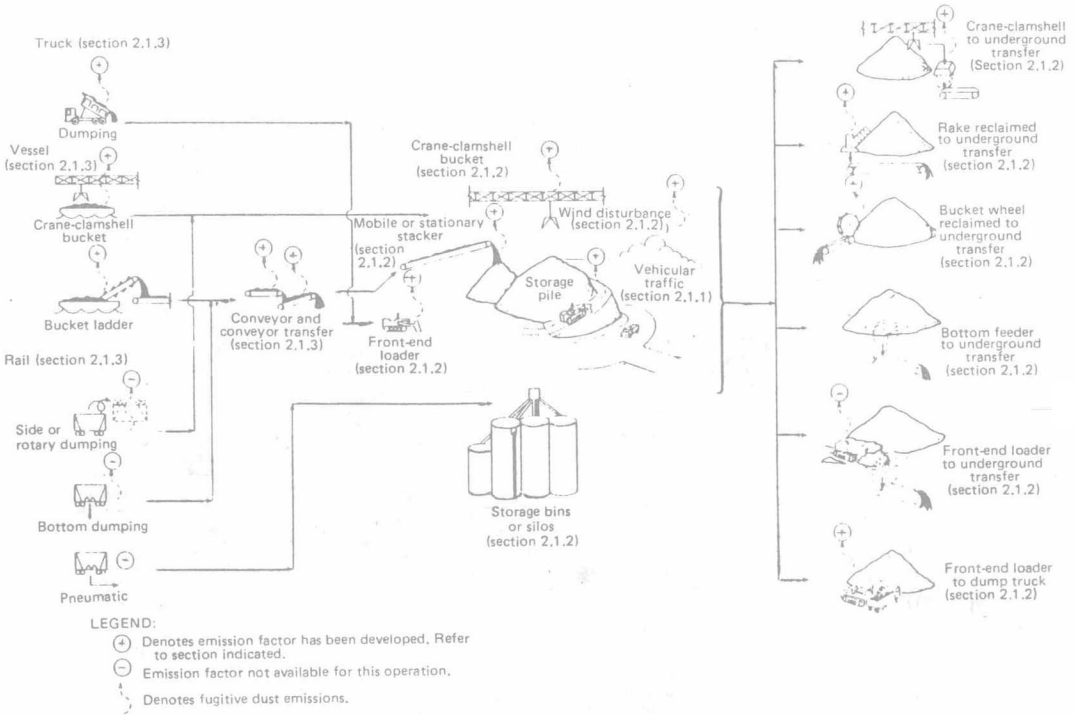

Figure 2.1-1. Order and location of general fugitive dust sources in a hypothetical industrial setting.

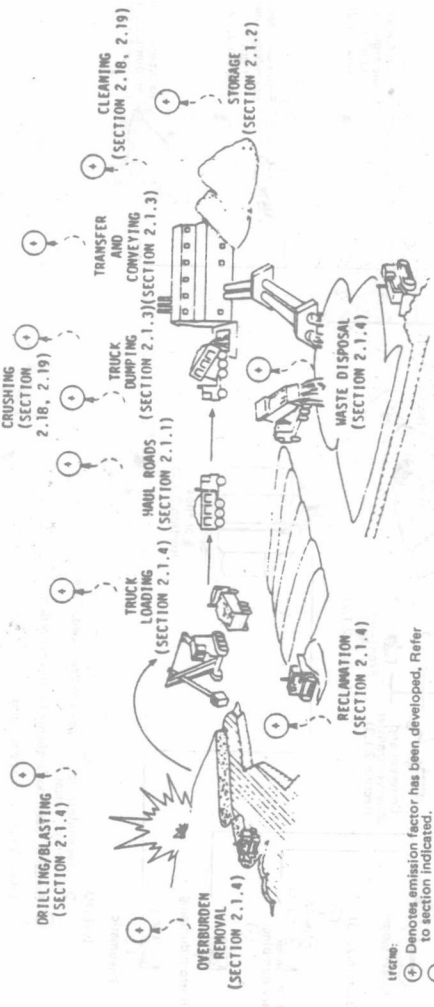

Figure 2.1-2. Order and location of general fugitive dust sources in hypothetical mineral mining operation.