

SECTION 1.0

INTRODUCTION

1.1 Background

Proper operation and maintenance (O&M) of air pollution control equipment minimizes emissions of air pollutants, reduces equipment malfunctions, and ensures continued compliance with Ohio's air pollution control regulations and permit requirements. Regardless of how well an air pollution control system is designed, poor O&M can lead to the deterioration of its various components and to a decline in its pollutant removal efficiency. Thus, the success of an air pollution abatement program ultimately depends on the proper O&M of the installed air pollution control equipment.

Proper O&M also affects equipment reliability, on-line availability, continuing regulatory compliance, and regulatory agency/source relations. The gradual deterioration in equipment due to lack of timely and proper O&M increases the probability of equipment failure and decreases both the reliability and on-line availability of the equipment. When process operations must be curtailed or shut down to minimize emissions during outages of air pollution control equipment, the plant's productivity suffers. Also, frequent violations of emission limits can result in more inspections, potential fines for noncompliance, and sometimes, mandatory shutdown until emission problems are solved.

This document presents technically sound O&M guidelines for various types of air pollution control equipment commonly used in Ohio. The Ohio Environmental Protection Agency (EPA) and Ohio's local air agencies are making these guidelines available to assist Ohio industry in developing O&M programs. The Ohio EPA and Ohio's local air agencies will also use these guidelines 1) in reviewing preventive maintenance and malfunction abatement plans submitted by regulated entities pursuant to OAC Rule 3745-

15-06(D) and 2) in working with regulated entities with a history of control equipment malfunctions.

This manual focuses on O&M of eight types of air pollution controls (APCs):

1. Mechanical collectors (single and multiple cyclones, and Roto-Clones)
2. Fabric filters (shaker, reverse-air, and pulse-jet units, including dry scrubbers)
3. Electrostatic precipitators (both wet and dry)
4. Carbon adsorbers
5. Incinerators (thermal and catalytic units)
6. Flares
7. Wet scrubbers (spray chambers, venturis, packed-bed units, and tray towers)
8. Condensers (including refrigeration systems)

1.2 Intended Users of the Manual

The manual is designed to be an educational tool for plant and EPA personnel. No attempt is made to tell plant personnel how to operate a plant; rather, the manual provides cause-effect relationships to assist in preventing or locating problems. It will not only serve as a handy O&M reference, but will also provide the necessary information to assist plant personnel in the preparation of their own site-specific O&M manual.

The intended audience consists of the plant environmental engineer, plant O&M personnel, and EPA field personnel. The contents, however, are slanted toward the concerns of the plant environmental engineer, who with the assistance of his/her staff is responsible for long-term control strategies, O&M plans, preparation of bid specifications, and analyses of performance trends. The information presented herein will also enable plant O&M personnel to recognize potential problem areas as well as existing problems, their underlying causes, and their solutions.

The information provided should also help EPA field personnel to determine if the APC is operating within applicable regulations, to judge the effectiveness of the plant's O&M program, and to assess the causes of poor APC performance.

The responsibilities of the plant environmental engineer will generally include proper O&M of the APC, for a wide range of trends analyses related to APC performance, and for background information during the preparation of bid specifications. This manual does not attempt to replace the step-by-step O&M manuals prepared by APC vendors or documents developed by the plant for a site-specific application. Neither does it directly address the development of bid specifications. It does, however, attempt to provide sufficient detail to enable the plant environmental engineer to evaluate the plant's present O&M program and to determine if and where improvements are needed.

Plant O&M personnel should not use this manual for specific instructions on maintenance and repair procedures. Such instructions should be provided by the equipment manufacturer, and minor modifications should be made by plant personnel to fit site-specific needs. This manual presents general operating guidelines that can be used as a background document for determining the completeness of the plant's operating manual, preventive and corrective maintenance procedures, and troubleshooting and inspection procedures.

For Ohio EPA field personnel, the manual provides guidelines for conducting a field inspection of APC systems. Emphasis is on the inspection methodology for evaluating both equipment and performance. Discussions do not include topics covered in detail elsewhere (e.g., equipment design theory, regulatory concerns, and source testing and opacity readings).

1.3 Manual Organization

Section 2 of this manual presents general procedures to follow in the development of an O&M program to minimize APC malfunctions and operating problems that could result in a violation of allowable emission limits. This section also contains recommended management oversight procedures for maintaining awareness of the status of APC O&M.

Sections 3 through 10 present O&M guidelines specific to each of the eight APCs listed above. A brief description of each APC is followed by guidelines on APC monitoring and inspection, major problems and malfunctions, routine maintenance, and operator training. The APC descriptions do not provide "textbook coverage"; such information is readily available in technical literature. Neither are specific instructions for O&M procedures provided because of the unique nature of these control device systems and of the process streams they serve. The intent of this document is to prescribe the basic elements of good operating practice and preventive maintenance programs that can be used as the basis and framework for tailored, installation-specific programs.