SECTION I

UNDERSTANDING THE DIFFERENCES BETWEEN OUTDOOR AND INDOOR AIR POLLUTION

SOURCES AND REGULATION OF AIR POLLUTION

Air pollutants can be generated by a variety of outdoor or indoor sources and affect the overall quality of public health and the environment. Air pollutants have many sources, such as:

- Combustion sources that emit pollutants through smokestacks.
- Automobile and diesel exhaust emissions.
- Dust generated from renovation, remodeling, or construction work.
- Fumes from paints, solvents, and the installation of new furnishings or finishes.
- The application of pest control chemicals.
- Dust and fungi generated from general building maintenance or housekeeping activities.

OUTDOOR AIR QUALITY CONSULTANTS

Air quality consultants work to regulate or maintain air pollution that impacts public health and the outside environment. The following are four common types of outdoor air quality consultants and their activities.

General Air Pollution Consultants

The most common type of air quality consultant is the **General Air Pollution Consultant**. These consultants work primarily with industrial and commercial companies to provide solutions for controlling outdoor air pollution. They also offer technical support to comply with federal, state, and local environmental laws and regulations. General air pollutant consultants conduct a variety of all-purpose outdoor air pollution control activities, including:

- Determining the applicability of regulatory requirements under state and federal air pollution control regulations (i.e., New Source Performance Standards [NSPS], National Emission Standard for Hazardous Air Pollutants [NESHAP], state offset requirements, and the Prevention of Significant Deterioration [PSD] program) to business and industry.
- Helping business and industry complete and submit air quality permit applications for the state's Permit to Install (PTI) and Renewable Operating Permit (ROP) programs, including assistance with Best Available Control Technology (BACT), Best Available Control Technology for Toxics (T-BACT), and Maximum Achievable Control Technology (MACT) determinations.
- Air dispersion modeling.
- Drafting permit conditions and enforcement and consent order negotiations with regulatory personnel on behalf of an air pollution source.
- Developing fugitive dust control programs and risk management plans for business and industry.
- Completing and submitting applications for the state's air pollution control new equipment tax credit on behalf of an industrial facility.
- Helping business and industry participate in the state's Emissions Trading Program.
- Assisting air pollution sources with general recordkeeping, reporting (such as the Michigan Air Emission Reporting System or MAERS), and facility audits.

Source or "Stack" Testers

A second type of air quality consultant conducts source emission tests and is called a **Source Sampler or "Stack" Tester**. Source samplers must understand federal regulations governing air quality testing under Title 40, Parts 51, 60, 61, and 63 of the *Code of Federal Regulations* and extensive experience utilizing the U.S. EPA testing and sampling methods and protocols located in Part 10 of the *Michigan Air Pollution Control Rules*. Environmental professionals who qualify as industrial source or "stack" testers conduct source sampling to determine compliance with permitted emission limits for one or more of the following:

- Metals such as lead, chrome, cadmium, zinc, and mercury.
- Clean Air Act criteria pollutants such as particulate matter (PM), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and volatile organic compounds (VOCs).
- Other pollutants, such as non-methane organic compounds (NMOC), which are present at landfills; dioxins and furans; organics and inorganics; and hazardous air pollutants (HAPs).

Source samplers either send samples to an off-site laboratory for analysis or have an analytical laboratory on site.

Ambient Air Monitors

A third type of outdoor air quality consultant is an **Ambient Air Monitor**. These outdoor air quality consultants monitor or sample for industrial or commercial companies as required:

- Under Part D (the PSD requirements) of the Clean Air Act Amendments for certain new major stationary industrial sources and major industrial modifications to an existing air quality permit subject to a preconstruction review.
- For hazardous waste disposal facilities (under Michigan Public Act 451 of 1994, Part 111).
- As part of an air permit or consent order judgment.
- By the U.S. EPA's quality assurance requirements of Title 40, Part 58 of the *Code of Federal Regulations.*

Continuous Emission and Continuous Opacity Monitors

A fourth type of outdoor air quality consultant provides **monitoring services for emission (CEMS) and opacity (COMS) monitors**. These continuous monitors are attached to industrial sources to measure levels of air pollution in a process. The types of CEMS/COMS activities typically conducted by air quality consultants include certifying the performance specifications for industrial continuous monitoring systems by:

- Developing and submitting pre-installation monitoring plans.
- Conducting quality assurance testing of instrumentation (i.e., Relative Accuracy Test and Cylinder Gas Audits).
- Generating excess emission and certification reports on behalf of a facility.

Environmental consultants and professionals conducting performance tests for CEMS or COMS must understand Title 40, Part 60, Appendix B of the *Code of Federal Regulations.*

Other air quality professionals have expertise as:

- **Process Consultants** who focus their expertise on modifying the existing *process* equipment (for example in a manufacturing facility) to decrease the type or amount of air contaminant emissions from that process.
- **Product/Equipment Vendors** who sell new or replacement components for process and/or air quality control equipment.
- **Environmental Attorneys** who, although not officially designated as an "environmental consultant," specialize in environmental law, often helping individuals and businesses determine the economic and legal impact of problems resulting from air pollution.

REGULATION OF OUTDOOR AIR POLLUTION

Outdoor air pollution is primarily regulated by the U.S. EPA at the federal level and the Air Quality Division (AQD) of the DNRE at the state level. The following federal and state contacts can provide additional information about outdoor air quality in Michigan:

- U.S. Environmental Protection Agency, Region 5
  Office of Air and Radiation
  77 W. Jackson Blvd.
  Chicago, IL 60604
  Telephone: (800) 621-8431
  www.epa.gov/oar

- Michigan Department of Natural Resources and Environment
  Air Quality Division
  P.O. Box 30260
  Lansing, Michigan 48909
  Telephone: (517) 373-7023
  www.michigan.gov/degair

INDOOR AIR QUALITY CONSULTANTS

The diagnostic activities conducted by indoor air quality consultants is more complex than those conducted by outdoor consultants since indoor air sampling takes place in a constantly changing environment. Controlling indoor air quality involves integrating three main strategies:

- Managing the sources of pollutants, either by removing them from the building, or isolating them from people through physical barriers, air pressure relationships, or by controlling the timing of their use.
- Diluting pollutants and removing them from the building through ventilation.
- Using filtration to clean the air of pollutants.

Air quality consultants that handle most indoor-related air pollution are called **Industrial Hygienists.** Industrial Hygienists monitor the workplace or home for exposure to environmental hazards (i.e., airborne contaminants) that could adversely affect human health over a period of time. Using specialized equipment, an industrial hygienist collects samples of air contaminants to determine if a hazardous exposure has occurred or currently exists and makes recommendations for improvement based on the results of these samples. Some of these recommendations include employee monitoring programs in the workplace, equipment redesign, or system modifications designed to achieve federal, state, and local indoor air quality compliance.

Air quality professionals who are qualified to conduct work in the industrial hygiene field have extensive training in ventilation engineering, environmental health, toxicology, and microbiology. Industrial hygienists help determine the existence of:

- Air contaminants such as asbestos, mold, lead, radon, and formaldehyde, as well as other toxic substances or biological agents.
- Problems with air exchanges in building ventilation systems.
- Health hazards
- Excessive or damaging noise levels.
- Heat and cold stress.
- Work-related ergonomic problems (i.e., injury prevention through proper design of the workplace so that it accommodates human capabilities).

Additionally, industrial hygienists also assist with:

- The selection of personal protection equipment.
- The establishment of an on-site industrial hygiene program.

An industrial hygienist may operate independently or be affiliated with a larger environmental, health, and safety consulting company.

REGULATION OF INDOOR AIR POLLUTION

Indoor air quality, especially as it relates to the occupational health and safety of workers in business and industry, is regulated by the federal Occupational Safety and Health Administration (OSHA) and the Michigan Department of Energy, Labor and Economic Growth, Bureau of Safety and Regulation (Michigan's OSHA or MIOSHA). No agency regulates indoor air quality in private homes. To understand how to maintain proper indoor air quality, contact the following agencies:

- Indoor Air Quality Information Clearinghouse (created and supported by the U.S. EPA)
  IAQ INFO
  P.O. Box 37133
  Washington DC 20013-7133
  Telephone: (800) 438-4318
  www.epa.gov/iaq/iaqinfo.html

- OSHA
  Office of Outreach Services and Alliances
  Directorate of Cooperative and State Programs
  200 Constitution Avenue, NW
  Room N-3700
  Washington, DC 20210
  (202) 693-2340
  www.osha.gov

- Michigan Department of Energy, Labor and Economic Growth
  Bureau of Safety and Regulation - MIOSHA
  P.O. Box 30643
  Lansing, Michigan 48909-8143
  Telephone: (800) 866-4674
  www.michigan.gov/dleg

- Indoor Air Quality Association (IAQA)
  Grand Rapids, Michigan Chapter
  2930 Three Mile Rd., N.W.
  Grand Rapids, MI 49544
  Voice: 616-735-1515
  Fax: 616-735-2923
  www.iaqa.org

DIAGNOSTIC TESTING AND SAMPLE ANALYSIS (INDOOR AND OUTDOOR AIR POLLUTION)

An important and complementary component of both indoor and outdoor air pollution is the process of sample analysis, often completed by an **analytical laboratory**. Analytical laboratories receive samples from source testing companies (such as a "stack" tester or an industrial hygienist) in order to track, test, or verify the contents and volume of an air sample or contaminant. Analytical laboratories can also be used to evaluate samples of fuels or paints for concentrations of potential air pollutants. Analytical laboratories can conduct the following types of testing services:

- Determining the concentration of air pollutants in a collected sample.
- Analyzing fuel for British Thermal Unit (BTU) content, ash content, and sulfur presence in coal, oil, etc.
- Determining the presence and concentration of mal odors.
- Determining the presence of bacteria and fungus, chemicals, gases, dust, asbestos, and fumes.
- Analyzing paint coating samples to determine the percentage by weight and volume of solids, VOCs, exempt VOCs, water content, and paint density.

Laboratories conducting outdoor air quality analyses should be able to meet all relevant U.S. EPA program requirements, including quality assurance/quality control, proper use of specified methods, and other analytical measurement criteria. Laboratories conducting indoor air quality analyses should meet all relevant quality assurance/quality control criteria for each respective industrial hygiene, environmental lead, or environmental microbiology lab accreditation program.

WHEN TO TURN TO AN AIR QUALITY CONSULTANT

Addressing the cause of a specific air pollution problem can be a very challenging task. Therefore, it is important to understand when an air quality consultant is used, the different types of air quality consultants that exist, and what types of services or expertise each can provide. In most cases, deciding to seek the services of an air quality consultant will depend largely on:

- Whether an independent opinion is needed.
- If an individual or business is at an impasse on an environmental, health, or safety issue.
- Whether internal resources within a business exist to adequately address the issue.

Most often, air quality consultants:

- Supplement existing staff or a business knowledge base.
- Provide technical or economic analyses (e.g., quality assurance of company data/reports).
- Develop alternatives and make recommendations (i.e., site remediation).
- Complete a one-time project.
- Assist with equipment selection or purchase, installation, and start-up.
- Complete annual tasks such as facility audits, emissions inventory reporting, permit applications, emissions testing, indoor air quality testing, etc.
- Negotiate or enforce environmental, safety, or health compliance.
- Provide engineering support through studies, design, and construction assistance.