



**Orange County  
Public Schools**

Environmental Compliance  
and Sustainability

**INDOOR ENVIRONMENTAL QUALITY  
(IEQ)  
MANAGEMENT PLAN**

## **TABLE OF CONTENTS**

### ***Section 1 — Introductory Information***

Objective.....	1
Common Terms .....	1
What is the OCPS IEQ Management Plan .....	1
Why Do We Need a Management Plan.....	2
Understanding IAQ Problems and Solutions .....	3
Communication.....	5

### ***Section 2 — How Does the Management Plan Affect Me***

IEQ & the School Administrator.....	6
What to Do When IAQ Problems Arise.....	7

### ***Section 3 — The Indoor Environmental Quality Management Plan***

Highlights of the OCPS IEQ Management Plan.....	9
Building Designs and Preventative Maintenance Procedures.....	9
Assess Current Status .....	10
Summer Inspections .....	11
Repairs and Upgrades .....	12
Re-Assess .....	12

### ***Section 4 — Indoor Environmental Quality Information for Staff***

Introduction.....	13
How the OCPS IEQ Management Plan Works.....	13
How to Determine if You Have an IEQ Problem.....	14
Determining the Cause of IEQ Problems.....	14
Typical Sources of Indoor Air Pollutants.....	16
Resolving IEQ Problems.....	17
Communication Principles.....	18
Who Will Investigate and Solve Major Problems .....	19
Solving IEQ Problems.....	19
Evaluating the Practicality of a Solution .....	21
Impact on IEQ.....	22
Persistent Problems.....	22
Untraditional IEQ Complaints.....	22
Custodial Guide to Cleaning Mold Growth.....	23
IAQ Investigation Flow Chart.....	24

### ***Section 5 — IEQ Related Programs***

American Lung Association - Asthma Friendly School .....	25
Florida Asthma Coalition - Asthma Friendly School.....	25
EPA - Tools for Schools.....	25

# 1 Introduction and General Information

## Objective

The objective of the Orange County Public Schools (OCPS) Environmental Compliance is to create and implement the OCPS Indoor Environmental Quality Management Plan, train OCPS personnel in all aspects of good indoor environmental quality, assist in the investigation and remediation of potential indoor air quality problems and verify the effectiveness of the plan and corrective measures.

## Common Terms

- a) **Indoor Air Quality (IAQ)....** A general term that includes all characteristics of the quality of the air within a structure.
- b) **Indoor Environmental Quality (IEQ)....** A term that is sometimes used interchangeably with IAQ, IEQ encompasses more than just the air quality and looks at factors such as noise, lighting, pest control and cleanliness of the indoor environment.
- c) **Sick Building Syndrome....** A term used to describe situations in which

building occupants experience substantial health and/or comfort effects that appear to be linked to time spent in a particular building, but where no specific illness or cause can be identified. Symptoms often are alleviated when the occupants leave the building.

### e) Building Related Illness....

A diagnosable illness whose symptoms can be identified and whose cause can be directly attributed to airborne building pollutants (e.g.,



Legionnaire's disease, hypersensitivity, Pneumonitis). The symptoms are not alleviated when the patient leaves the building.

f) **HVAC....** Heating Ventilation and Air Conditioning system. This includes but is not limited to: all duct work, refrigeration equipment, air handlers, exhaust fans, thermostats, piping, pumps, and cooling towers associated with the system.

g) **Pollutant....** Any substance that is foreign to the indoor environment.

h) **Relative Humidity....** A term used to describe the amount of moisture in the air. 50% RH indicates the air is 50% saturated or 50% full of water. As air temperature increases, the resulting expansion enables the air to hold more water and the

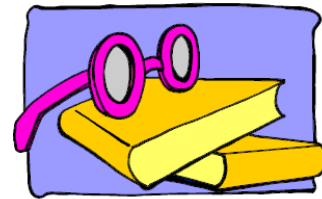
relative humidity decreases. Conversely as air is cooled, it contracts and the ability to hold moisture is reduced. This results in increased relative humidity.

i) **Reheat....** The practice of cooling air to achieve maximum moisture reduction then reheating it to achieve comfortable temperatures with low relative humidity.

j) **Plenum....** A space above a ceiling or between floors and/or walls that is used as a passage way for air.

## What is the OCPS IEQ Management Plan

The OCPS IEQ Management Plan is a blueprint for success in dealing with the



IEQ issues the district currently faces and those that may occur in the future. The three goals that must be achieved to ensure success are:

1. To promptly and effectively deal with IEQ problems
2. To effectively eliminate or minimize conditions that can cause IEQ problems



3. To prevent problems from occurring in the future.

The action plan that has been established to accomplish these goals follows the EPA's Tools for Schools guidance and consists of the following steps:

1. Establish standard operating procedures for responding to IEQ problems
2. Instill an IEQ awareness that leads to preemptive actions
3. Ensure that new Construction and Renovation designs are compatible with good IEQ

**Why Do We Need a Management Plan?**

Most people are aware of the problems that outdoor air pollution can cause; however, many people are not aware that indoor environmental pollution can also have significant health effects. Environmental Protection Agency (EPA) studies of human exposure to air pollutants indicate that indoor levels of pollutants may be 2-5 times, and occasionally more than 100 times, higher than outdoor levels. These levels of indoor air pollutants are of particular concern because it is estimated that most people spend approximately 90% of their time indoors. Comparative risk studies performed by the EPA and its Science Advisory Board have consistently ranked indoor air pollution

among the top five environmental risks to the public. Failure to prevent or respond promptly to indoor environmental problems in our schools can have the following consequences:

- Increased potential for long and short term health problems experienced by building occupants
- Reduced productivity of teachers, students and staff due to discomfort, sickness, or absenteeism
- Accelerated deterioration and reduced efficiency of the school facilities and equipment
- Strained relationships among school administration, students, parents and staff

Indoor environmental problems can be subtle, and do not always produce easily recognizable impacts on building occupants or the physical plant. IEQ problems may occur even in schools where a conscientious effort is being made to avoid them. Children may be especially susceptible to the ill effects of air pollution, which makes the environmental quality in our schools a major concern. The proper maintenance of the indoor air and environment is more than a "quality" issue. It encompasses the safety of our future leaders and the stewardship of our investment. Properly implemented IEQ Management Programs equip schools to effectively deal with these problems when they arise. Additional reasons for instituting an IEQ Management Plan include:

- Providing a heightened awareness of preventative IEQ measures among front line staff members
- Quicker and more cost-effective response to problems when they arise
- Well maintained physical plants and equipment which provide better comfort, are more efficient and last longer
- Fewer crisis interventions that involve upper-level management



**Understanding IAQ Problems and Solutions**

Over the past several decades, exposure to indoor air pollutants has increased due to a variety of factors, including the construction of more tightly sealed buildings, reduced ventilation rates designed to conserve energy, minimal humidity controls, the use of synthetic building materials and furnishings, and the use of chemically-formulated personal care products, pesticides and housekeeping supplies.

The problems that typically affect schools can be grouped into four categories:



- 1) Sources of indoor air contaminants
- 2) Heating, ventilation, and air-conditioning (HVAC) systems
- 3) Pollutant pathways
- 4) Occupants

**Sources of Indoor Air Contaminants**

Air contaminants may be generated by almost anything including: stored cleaning chemicals, flaking paint, dust accumulations, mildew, brush fires, and construction sites. These contaminants can be emitted from point sources, such as from science storerooms, or from area sources, such as newly painted surfaces.

Contaminants can also vary with time, being emitted only once each week when floor stripping is done, or continuously such as fungi growing in high relative humidity. Indoor air contaminants can originate from sources within a building or come in from outdoor sources. When contaminant sources are not controlled, IEQ problems can arise even if the HVAC system is properly operating.

If we hope to control contaminants, we must be acutely aware of their sources and eliminate them or ensure that they do not adversely affect indoor environmental quality. This will require knowledge of the various contaminants normally stored or used in each facility, routine inspections to evaluate storage practices, and

assurance that adequate mechanical or physical measures are in place for effective control. These inspections should also address any previously unknown materials that may be discovered.

All chemicals stored at your facility should be documented on the Environmental Compliance District Collaboration Site under Chemical Inventory.

**HVAC System Design and Operation**

The second typical school IEQ problem is the design and operation of the heating, ventilation and air-conditioning (HVAC) system. The design and operation of the HVAC system should address the following needs:

- Control of temperature and relative humidity to provide thermal comfort and eliminate the adverse effects of high relative humidity on buildings and occupants
  - Distribution of adequate amounts of outdoor air to meet ventilation standards and the needs of the school occupants
  - Isolation and removal of odors and pollutants through pressure control, filtration, and exhaust fans
- Not all HVAC systems are designed to accomplish all of these functions. Some buildings rely on natural



ventilation, while others lack mechanical cooling equipment, and many function with little or no relative humidity control. The two most common HVAC designs used in schools are central air handling systems and unit ventilators. Both perform the same HVAC functions, however the central air handling unit serves multiple rooms while the unit ventilator serves a single room or a portion of a room.

In order to maintain good IEQ, each unit must be routinely inspected to ensure that it is operating in accordance with original design specifications and that satisfactory sanitation levels are being maintained.

**Contaminant Pathways and Driving Forces**

The third typical IAQ school problem is the movement of air contaminants from one area to another by driving forces and contaminant pathways. Airflow patterns in buildings result from the combined forces of mechanical ventilation systems, human activity, and natural effects. Air pressure differences created by these factors move airborne contaminants from areas of higher pressure to areas of lower pressure through any available openings in building walls, ceilings, floors, doors, windows, and HVAC systems. An inflated balloon is an example of this driving force. As long as the opening to the balloon is kept closed, no air will flow, but when

open, air will move from inside (area of higher pressure) to the outside (area of lower pressure).

Even if the opening is small, air will move until the pressures inside and outside are equal. In order to control these problems we must ensure that our interior spaces are maintained at a positive pressure with respect to the outside and areas where contaminants may be generated (i.e. laboratories, custodial closets, etc.).

### Building Occupants

The fourth potential classroom IAQ problem can be created by the building occupants themselves. Occupants contribute an endless stream of air pollutants in the form of perfumes, deodorant, viruses, bacteria, and Carbon Dioxide (CO<sub>2</sub>). Occupants of schools include the students, teachers and staff as well as other people who spend extended periods of time in the facility. The effects of IEQ problems caused by these pollutants are often non-specific symptoms rather than clearly defined illnesses.

Symptoms commonly attributed to IEQ problems include:

- Headache, fatigue and shortness of breath
- Sinus congestion, cough, and sneezing
- Eye, nose, throat and skin irritation
- Dizziness and nausea

Each of these symptoms can also be caused by other factors, and may not necessarily be due to air quality deficiencies. Environmental stressors such as improper lighting, noise, vibration, overcrowding, ergonomic stressors and psychosocial problems (such as job or home stress) can produce symptoms that are similar to those associated with poor air quality.

Because of varying sensitivity among people, one individual may react to a particular pollutant problem while surrounding occupants have no noticeable ill effects. In other cases, complaints may be widespread. In addition to different degrees of reaction, an indoor air pollutant or problem can trigger different types of reactions in different people.

Groups that may be particularly susceptible to the effects of indoor air contaminants include, but are not limited to:

- Allergic or asthmatic individuals
- People with respiratory disease
- People whose immune systems are suppressed due to radiation or chemotherapy
- Contact lens wearers

### Solutions

In order to deal with these issues we must develop a program that will instill an

awareness of IEQ problems, the conditions that cause IEQ problems, and institute a preventative maintenance program within school facilities.

In addition to a proactive program designed to prevent IEQ problems we must also institute a reactive program designed to deal with IEQ issues that may arise despite our best efforts to prevent them.



### Communication

Because indoor environmental quality problems are perceived to jeopardize the health of students and staff, parents and the public may react strongly to reports of poor indoor environmental quality in a school. When IEQ concerns are raised, they will often stimulate concerned, emotional, and potentially fearful responses. The key to dealing with these aspects of IEQ problems is clear, concise, and meaningful



communication among all those involved.

With this in mind, it is recommended that everyone follow the communication guidelines established by the Environmental Compliance Department in Section 4.

Usually, this will involve simply referring questions to Environmental Compliance. In this way, students, parents, staff, and the public will not become alarmed by conflicting or inaccurate statements, and a consistent and complete source of information regarding the quality of the indoor environment in a particular school will always be available.

# 2

## How Does the Management Plan Affect Me?

### IEQ & the School Administrator

#### Respond to building conditions and occupant concerns

The responsibility for good indoor air quality in OCPS facilities falls upon each and every OCPS employee. However, School Administrators have a key role in the early detection of IEQ symptoms and complaints. They must be able to recognize the various problems that can develop into IEQ concerns and follow established procedures for promptly notifying Environmental Compliance when problems arise or concerns are expressed.

When building occupants express concerns regarding temperatures within their space, it is important to keep in mind that comfort is a factor of temperature, relative humidity, and airflow. A problem in any of these areas can adversely affect the comfort of building occupants. Identifying and eliminating comfort problems can avoid more serious problems at a later date as well as increase the

productivity of those individuals who are affected.

#### Housekeeping

Cleanliness is a major factor in maintaining good IEQ. All interior spaces must be thoroughly cleaned on a regular basis. Dust, insects and their droppings, mold and other debris can cause serious allergic reactions in some individuals. Custodians must be encouraged to maintain a clean facility and to report any adverse conditions (excess relative humidity, mold growth, roof leaks, etc.) that they may encounter during their rounds. Evidence of roof leaks like the ones pictured below should be reported immediately.



It is also important that custodians periodically pour water down all sewer traps to ensure that the water seal remains intact. Sewer gas can enter the building through these traps when infrequent use allows the water to evaporate.

When Custodians vacuum carpets the potential for aerosolizing dust particles and other debris is very high. It is important that vacuums have a filtration system, such as, bags.

The proper storage of custodial chemicals is essential in maintaining good IEQ. These items must be stored in a well-ventilated space that exhausts to the outside of the building. These and other chemicals should never be stored in mechanical rooms where the odors may be drawn into the ventilation system.

#### Facility Usage

Many activities that take place in a school setting have the potential for adversely affecting IEQ. Do not conduct activities that emit odors, engine exhaust or chemicals unless exhaust fans or other equipment is in place to adequately deal with these emissions. Examples of particular concerns include laser printers, copiers, photographic fluids, paints and gasoline engines.

#### Animals Stored In The Classroom

Animals stored in the classroom can cause adverse reactions in individuals with allergies. It is important to limit such activities when mechanical systems are not in place to ensure adequate removal of the odors, dust, and dander that can be generated.





### **Maintain Records of Individuals with Asthma and Allergies**

Since various activities that may occur in or near your facility (construction projects, science experiments, brush fires, etc.) may cause adverse reactions in individuals with heightened sensitivities, it is important that you know which building occupants may require special consideration should any of these events occur.

### **Disaster Response**

When water finds its way into your facility due to flooding, roof leaks, carpet cleaning or spills it is important that the moisture be removed promptly and thoroughly. It is also important to clean up chemical spills before they create excessive odors in the building. Keep in mind that some hazardous chemicals require special cleanup procedures.

Call the Environmental Compliance Department if you have the slightest concern regarding chemical spills.

### **Asbestos**

The Environmental Compliance Department is responsible for identifying, managing and removing asbestos containing materials in OCPS facilities. It is important that the school administration become familiar with the information contained in the Asbestos Management Plan which can be found on the district collaboration site for each school. The documents on the District Collaboration Site

will provide valuable information regarding the location of asbestos containing materials, condition of the building materials, and proper management.

### **Renovations**

Before commencing with renovation projects, it is important to identify all aspects of the project that may adversely affect building occupants. These include but are not limited to construction dust, periods when heat, air or ventilation systems will be inoperable and odors generated by equipment and building materials (hot tar, etc.). The various Facilities Services departments, (Construction Management, Maintenance, and Environmental Compliance) will evaluate potential problems and develop a plan to eliminate or minimize their effects. However, it is important for facility administrators to be aware of any adverse conditions that develop so that they can ensure that corrective measures are taken.

### **Chemical Inventory**

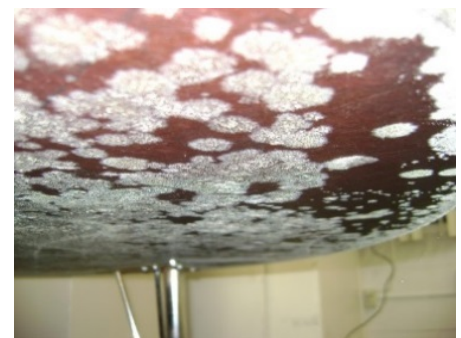
The Environmental Compliance Department maintains records of the various chemicals that are stored at each facility to ensure the safety of fire fighters in the event of a fire. This database is compiled from the information that is received on the chemical inventory forms which are completed every year. It is important that the inventories are kept up to date since this information is also helpful in investigating chemical related

IEQ problems. Schools must maintain copies of the Safety Data Sheet (SDS) for every chemical that students, staff, and employees may encounter.

## **What to Do When IEQ Problems Arise**

The following pictures depict various conditions that can indicate the potential for and/or the existence of an IEQ problem. All of these conditions should prompt immediate action on the part of school administrators or any other OCPS employee that encounters them.

### **Mold growth underneath school desks**



### **Mold growth and delimiting of concrete caused by moisture**



If you encounter any of these conditions, you should contact the staff member assigned to enter work orders for your work location and inform him/ her of your concerns. The Area Maintenance Customer Support Technician will then forward the work order to the Environmental Compliance Department, who will begin the initial investigation. During this investigation, the Environmental Compliance Coordinator will attempt to identify the source or sources of the problem and determine possible solutions.

It is the responsibility of the School Administrator to disseminate information obtained from the initial and follow-up investigations with his/her staff when requested. Requests from parents and media should be directed to the Records Management Department to submit an official request.

The entire process is depicted in the flow chart on page 25 of section 4. When sharing information with building occupants it is important that everyone follow the communication principles discussed on page 18, but above all be open and honest. Once an IEQ evaluation has been initiated the information should flow to the School Administrator until all IEQ concerns are resolved. If this does not happen, the School Administrator should call the Environmental Compliance Department directly and request an update.

# 3

## The Indoor Environmental Quality Management Plan

### Highlights of the OCPS IEQ Management Plan

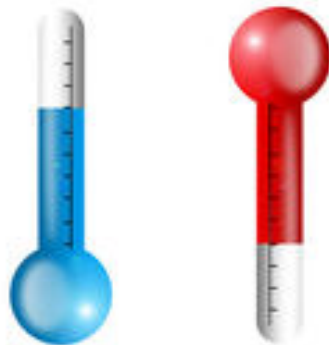
The OCPS IEQ Management Plan consists of the following segments:

1. Basic information pertinent to those interested in Indoor Air Quality (Section 1 - "Introduction and General Information")
2. A summary of the IEQ plan highlighting the roles of administrators and other members of the IAQ team. (Section 2 - "How Does the Management Plan Affect Me")
3. Procedures established to respond to IEQ concerns. A thirteen step policy to prevent IEQ problems. (Section 3 - "The Indoor Environmental Quality Management Plan")
4. An information packet for school administrators, custodians and district personnel aimed at preventing future IEQ problems as well as identify and resolving existing problems. (Section 4 - "IAQ

### Background Packet for PM Staff")

The successful implementation of this plan will require the collaboration and support of the Maintenance, Custodial Services, Construction, and Environmental Compliance Departments as well as the administration of each facility.

The overall approach to preventing IEQ problems involves the implementation of the following steps on a regular basis.



### Building Designs and Preventative Maintenance Procedures

#### 1. New Construction and Renovation Design Criteria

All new construction and renovations shall conform to District Guidelines which are reviewed and updated annually.

#### 2. Education

The information contained in this plan should be made available to all administrators and maintenance personnel. This will heighten awareness of the techniques that should be used to prevent IEQ problems and ensure that good HVAC maintenance practices are followed.



OCPS maintenance personnel are divided into three zones. Each has technicians who will provide the facility with the preventative maintenance (PM) required for each school. This will include a filter change, an inspection of the a/c system and basic cleaning (unless the need for a more thorough cleaning is indicated by the inspection). Filters for portables will be changed every 45 days and filters for buildings will be changed every 90 days.

#### 3. Custodial Services are an essential component of good IEQ.

Custodial practices are essential in maintaining good indoor environmental quality. Good housekeeping practices should be implemented in all rooms, not only by Custodial staff, but also by all building occupants.

Cleaning practices that should be done frequently are:

- a) Dusting of horizontal surfaces should be completed weekly. Personal items should be removed from surfaces on occasion to allow Custodial staff to dust.
- b) Food should be sealed and food debris should be cleaned from surfaces immediately.
- c) Carpets shall be vacuumed and floors swept daily. Carpets shall be shampooed quarterly.

If mold growth is observed during cleaning, the flow chart on Page 24 should be followed.

#### 4. Implement strict restrictions on pest control products

The Grounds and Pest Control Department are the only trained personnel approved to use pest control products.

OCPS implements an Integrated Pest Management model for pest control, which can reduce the use of pesticides and provide an economical method of pest suppression.

IPM programs use current information on the life cycles of pests and their interaction with the environment. Pest populations are reduced and controlled by creating

inhospitable environments, by removing some of the basic elements pests need to survive or by blocking their access into buildings.

Pests may also be managed by other methods, such as traps, vacuums, or the judicious use of pesticides as a last resort. IPM programs consist of a cycle of inspecting, identifying, monitoring, evaluating, and choosing the appropriate method of control.

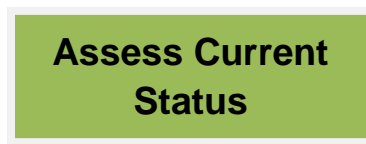
#### 5. Implement strict controls on the removal of lead containing paints

Buildings built prior to 1978 will require lead testing before physical removal of paint occurs. Proper protective measures shall be implemented following the U.S. Environmental Protection Agency (U.S. EPA) Renovation & Repair



Painting Program Guidelines.

In addition, no lead containing paint products will be utilized in OCPS Facilities.



#### 6. Identify potential radon pollution source

The Florida Department of Education published a memorandum titled "Radon Testing Requirements" dated July 14, 2000, which explains the radon testing requirements. All schools in counties designated within the Bureau of Community Environmental Health in the Division of Environmental Health Radon Protection Map categories as "Intermediate" or "Elevated Radon Potential" must determine the level of indoor radon. Orange County is considered a low radon potential county. Therefore, OCPS is not required to monitor for radon.

#### 7. Identify and manage all asbestos containing materials

The Environmental Protection Agency has issued a final rule, 40 CFR Part 763, Asbestos Containing Material (ACM) in schools. If asbestos is present in an OCPS school an Asbestos Management plan is located on the Environmental Compliance Department Collaboration Site. Asbestos Containing Materials, if present, are inspected by Environmental Compliance every six months to prevent exposure risk to students and/or staff. Damaged asbestos containing material is assessed, documented, and/or removed by a licensed asbestos contractor and monitored by a licensed asbestos consultant. Management plans are available for review on the Environmental Compliance Department Collaboration Site.

## Summer Inspections

### 8. IEQ Summer Inspection Program

The Summer Inspection Program was implemented in 2014 to reduce the occurrence of major mold growth events during the summer months. The weekly inspections are required to be completed by school administrators. Items that should be identified during the inspection are:

- a) The HVAC system is operating and the room does not feel humid.
- b) Stained ceiling tiles
- c) There are no signs of moisture intrusion or mold growth.
- d) No moldy, musty or objectionable odors are observed.

The weekly inspections are required to be entered into the Environmental Compliance Department Collaboration Site under Summer Inspections.

In addition, all IEQ complaints should be entered into WNA for Environmental Compliance to inspect. Environmental Compliance is required to inspect the facility within three (3) days of receiving the complaint.

Notifications can be made by using WNA, by email at [enviroaffairs@ocps.net](mailto:enviroaffairs@ocps.net), or by phone at 407-317-3945. This information will be

entered into the OCPS IEQ database and may be useful in dealing with or preventing similar occurrences in other facilities.

### 9. Identify Events that have the Potential to Affect IEQ

Consider whether any recent or proposed changes to the building, activities, schedule, or occupants, has had an impact on IEQ. The following factors should also be considered when attempting to prevent or resolve IEQ problems:

- a) Flooding or water infiltration can cause many problems. Look and smell for mold growth damp or wet areas.
- b) Have night or weekend classes been scheduled? Contact Energy Management to ensure your school is scheduled to be in occupied mode during those hours.
- c) Have new staff been added?
- d) Are there any construction projects or events occurring at or near the school that are ongoing or recently completed? (i.e. road work, fires, roofing projects etc.)
- e) Often it is helpful to provide building occupants with a mechanism to record the times and circumstances associated with IEQ problems or symptoms.

## Repairs and Upgrades

### 10. Commitment of Resources

The goal of inspections are to identify conditions which could potentially adversely impact IEQ.

The Environmental Compliance Department should be contacted at 407-317-3945 to assist in the evaluation of the information that is gathered and to provide input into the establishment of priorities. Ideally, concerns will be addressed before building occupants are adversely affected.



### 11. Distribute Status report

Keep school occupants and constituents informed about the general status of IEQ in their school according to the principles of effective communication which can be found on page 18.

The Environmental Compliance Department will provide a status report to facility administrators who will then be responsible for sharing this information with building occupants. Environmental Compliance personnel will be available to answer questions.

Arrangements can also be made for Environmental Compliance personnel to attend PTA, SAC and staff meetings.



## **12. Ensure Minimal Impact from Repairs, Renovations and Upgrades**

Strict environmental controls must be imposed over construction projects to ensure that building occupants are not subjected to adverse conditions during repairs, renovations, and upgrades. Facilities Maintenance staff must strive to ensure that remedial actions and upgrades do not compound IEQ problems.

When the work is likely to generate chemical fumes or excessive dust, the work areas should be isolated or work should be accomplished during periods when the facility is not occupied. It is important to ensure that schedules are kept and that the quality of the work is high in order to keep from compounding potential problems.

Remember, building occupants in a sick building have a heightened awareness of their surroundings and tend to be very critical and very vocal.

### **Re-Assess**

## **13. Conduct Follow-up Inspections**

The completion of IEQ work orders will be documented in the IEQ database which is maintained by the Environmental Compliance Department. This will prompt re-inspections to confirm that the intent of each remedial action has been achieved

according to the IEQ report that was issued.

Re-inspections are not the responsibility of Facilities Maintenance or the building administration.

# 4

## Indoor Environmental Quality Information for Staff

effort required to resolve problems after they develop

### How the OCPS IEQ Management Plan Works

#### Introduction

The goal of this section is to provide additional information that will help all staff understand the rationale for the procedures that were presented in the previous section. Once the basic principles and factors that influence a school's indoor environmental quality are understood, we will be better equipped to understand the rationale for the various activities in the IEQ Management Plan. The flow chart on page 25 will ensure that all members of the District are working together to accomplish the desired outcome.

Note that the activities focus around preventative maintenance, quick positive responses, and timely sharing of information. This guidance is based on the following principles:

- Many IEQ problems can be prevented by school based staff and students
- When IEQ problems do arise, they can often be resolved using the skills of the school staff
- The expense and effort required to prevent most IEQ problems is much less than the expense and

A well-run IEQ Management program yields substantial benefits for the school's employees and students. In addition to the obvious benefits to the health and well-being of building occupants, the expensive process of investigating and mitigating suspected IEQ problems can be reduced significantly or avoided entirely. The goal of this plan is to arm school-based personnel with the tools they will need to prevent IEQ problems and provide routine procedures that will help in the early identification of IEQ problems. In addition, the plan will provide skills and resources necessary to diagnose and resolve any problems that are encountered. A typical school provides many opportunities for IEQ problems to develop. Schools contain a variety of special use areas such as kitchens, laboratories, industrial arts, darkrooms, art, and storage areas for cleaning materials. Each of these areas contain products that have the potential to cause discomfort and health problems. Safety Data Sheets (SDS) for all materials stored in a facility should be uploaded into the Chemical Inventory on the Environmental Compliance Department Collaboration Site.

Like any other public or private building, problems in the design, construction, operation, and maintenance of the facility can contribute to IEQ difficulties as well. Significant IEQ problems often arise from combinations of common defects rather than from exotic or unique circumstances. Examples of these problems include:

- 1) A building that is not getting enough outdoor air (fresh air) because a fan belt is broken or slipping



- 2) A seldom-used drain trap that dries out resulting in sewer gases being drawn into the building
- 3) The design or condition of a building's roof, walls or windows allow significant air leakage through unintentional openings, resulting in moisture intrusion and an inability to maintain a positive pressure
- 4) A housekeeping product is mixed at double the recommended strength in the hope that it will do a "better job", and the unused mix is placed in an inappropriate container and stored in an air handler room. The resulting air contaminants

are then distributed to other parts of the building through the HVAC system.

## How to Determine if You Have an IEQ Problem

Relating physical symptoms to IEQ can be tricky. Symptoms of IEQ problems typically are similar to those from colds, allergies, fatigue, or the flu.



Indications of true IEQ problems can unfortunately be masked by symptoms resembling other problems. Some indicators to look for include:

- The symptoms are widespread within a given classroom or within the school
- The symptoms disappear when the students or staff leave the building
- The onset is sudden after some change at school (i.e. painting, pesticide application, or renovation project)

- Persons with allergies or asthma have reactions indoors but not outdoors
- A doctor has found that a student or staff member has an indoor air-related illness
- Changes in absenteeism

Utilizing the knowledge and techniques discussed throughout this management plan school personnel will be able to conduct preventative investigations.

The Environmental

Compliance Department should be kept informed of all concerns and investigations and should be notified any time the school based personnel feel that they have reached a dead end or reached the limit of their expertise.

## Determining the Causes of IEQ Problems

The goal of an IEQ investigation is to discover the cause of the problem so that an appropriate solution can be implemented. Often, more than one problem will be present, requiring more than one solution.

It is also important to have a good background knowledge of IEQ.

The Environmental Compliance Department will

provide training in basic IEQ investigation when requested.

When IEQ problems arise (despite proactive measures), the diagnostic process is set in motion. Many problems can be simple to diagnose, requiring only basic knowledge and some common sense.

Reading through this manual will teach you what you need to know to be able to assist Environmental Compliance in appropriately reporting IEQ concerns which will prove to be a valuable tool for diagnosing problems and will help simplify the process. This manual serves to lead the investigation in the right direction, offer suggestions for other areas to evaluate, and help the investigator determine when to request assistance from the Environmental Compliance Department. (Remember that pollutant sources and the ventilation system may act in combination to create an IEQ problem.) Often times a combination of events result in IEQ problems, i.e. a chemical is improperly stored and the contamination is spread throughout a large area due to a problem in the ventilation system.

If the investigation identifies a potential cause of the problem, (e.g. you find a blocked vent), place a work order in WNA to remedy the situation. Once corrected, evaluate to see if the symptoms dissipate.

Resolve as many problems as is feasible and make note of any problems that you intend to resolve later. Once

the potential cause(s) of the IEQ problem is (are) identified, resolve the problem and determine whether the complainants experience relief. Keep in mind that Environmental Compliance must be kept up to date with written and verbal progress reports whenever the identification and resolution of problems is accomplished by school-based personnel.

## Typical Sources of Indoor Air Contaminants

Sources Outside Building	Building Equipment	Building Components and Furnishings	Other Indoor Sources
<b>Polluted outdoor Air</b>	<b>HVAC Equipment</b>	<b>Components</b>	<b>Special Use Areas</b>
Pollen, dust, fungal spores, brush fires, paving, construction	Microbiological growth in drip pans, ductwork, coils & air handlers	Microbiological growth on soiled or water damaged materials.	Food Preparation Areas
Individual, emissions	Improper venting of combustion products	Dry traps that allow the passage of sewer gas.	Science Laboratories
vehicle emissions (buses parked in bus loop)	Dust or debris in ductwork	Materials containing damaged asbestos	Vocational Arts Areas
<b>Nearby Sources</b>	<b>Non-HVAC Equipment</b>	Materials that produce particles (dust)	Copying / Printing Areas
Loading docks, odors from dumpsters, unsanitary debris near outdoor air intakes	Emissions from office equipment (volatile organic compounds, i.e. duplicating machines, ozone from printers	<b>Furnishings</b> Emissions from new furnishings. Microbiological growth on soiled or water damaged materials.	Smoking Lounges. House-keeping and Maintenance. Cleaning Materials and procedures.
<b>Underground Sources</b> Radon Pesticides Leakage from UST's	Emissions from shops, labs, cleaning processes.		Emissions from trash. Volatile organic compounds from paint, caulk, adhesives.



## Resolving IEQ Problems

If you receive a complaint that seems to indicate a potential IEQ problem, report the incident to the Environmental Compliance Department.



### The school should report all IEQ concerns to the Environmental Compliance Department

Provide as much information as possible. This will require a preliminary investigation on your part and the realization that emergency situations must be reported immediately.

Most IEQ problems can be addressed and resolved quickly in the normal course of business.

If there is an emergency situation, in addition to immediate action to protect life and health, the Environmental Compliance Department will coordinate the notification of the appropriate authorities, OCPS Communications, school administrators, and parents.

## Effective Communication when Problem-Solving

When a major, and sometimes even minor, IEQ problem occurs, we can be assured that the school community will learn about it quickly. Without prompt and open communication, any IEQ problem can swiftly become complicated with rumors that are stimulated by anxiety, frustration, and distrust. These complications can increase both the time and resources needed to satisfactorily resolve a problem.

Immediate communication with the complainants and the school population is vital. In substantial cases, all communications should be initiated by the Environmental Compliance Department. A status report on each complaint will be kept up to date by the Environmental Compliance Department and provided to the administration of the affected facility for their information and dissemination to facility occupants when appropriate. All incidental questions that cannot be answered utilizing



firsthand information should be referred immediately to

the Environmental Compliance Department.

Paying attention to communication when solving a problem helps ensure the support and cooperation of school occupants as the problem is investigated and resolved. The basic, yet important, messages to convey are:

- Both the OCPS district and the school administration believe it is important to provide a healthy and safe school environment
- Good indoor environmental quality is an essential component of a healthful indoor environment
- Complaints about indoor environmental quality are taken very seriously.

While prompt attention and clear communication concerning IEQ problems should be initiated immediately, it is important that all personnel limit their discussions to topics that they are qualified to discuss and of which they have direct knowledge. Questions outside their areas of expertise should be referred to the Environmental Compliance Department. Be honest, frank, and open at all times, which include acknowledging the unknown.

Problems can arise from saying either too little or too much. Premature release of information when data gathering is still incomplete or premature conclusions as to the cause or extent of an IEQ problem can



produce confusion, frustration, and mistrust at a later date. Similar problems can result from incorrect representation of risk improperly assuming the worst case, or the best. However, if progress reports are not given, people will think that either nothing is being done, or that something unusual is happening.

You need not wait until an investigation is nearly completed, or until final data are available, before providing some basic elements of information.

Communications with appropriate parties, whether in conversations or in writing, should include the following elements in a factual and concise manner:

- The general nature of the reported problem, if it is known, the types of complaints which have been received, and the locations which are affected.
- What has been done to date to further define the problems or complaints, including the types of information that are being gathered and any field studies being conducted.
- What is being done as an initial response, including factors that have been evaluated and found not to be causing or contributing to the problem(s).



- How the school community can help.
- Work that remains to be done and the expected schedule for its completion.
- The telephone number for Environmental Compliance and the names of individuals who can be contacted for further information or to register complaints

Productive relations will be enhanced if the school community is given basic progress reports during the process of diagnosing and solving problems.

These reports will be provided by the Environmental Compliance Department.

It is advisable to explain the nature of investigative activities, so that rumors and suspicions can be countered with factual information. In addition, when necessary notices or memoranda may be distributed or posted in general use areas and delivered directly to parents and other interested constituents of the school community. Newsletter articles or other established communication channels can also be used to keep the school community up to-date if IEQ problems escalate to substantial levels. **All written communications must originate from or be approved by the Environmental Compliance Department.**

Even after the proper mitigation strategy is in place,

it may take days or weeks for contaminants to dissipate and symptoms to disappear. If building occupants are informed that their symptoms may persist for some time after solving the problem, the inability to bring instant relief is less likely to be seen as failure.



Many individuals may know that the problem has been solved; however, the school community may not be aware. A final report will ensure that everyone is aware of the outcome.

The information included in the next section “Communication Principles” will help ensure that all communications are effective.

## Communication Principles

All group and media communications will be conducted by the Communications Department. However, if you are required to present data keep these basic rules in mind:

- Be honest, frank, and open. Once trust and credibility are lost, they are almost impossible to regain. If you do not know an answer or are uncertain, say so. Admit

mistakes. Get back to people with answers. Discuss data uncertainties, strengths, and weaknesses.

- Respect your audience despite expressed differences of opinion. If people are sufficiently motivated, they are quite capable of understanding complex information, even though they may not agree with you. Furthermore, no matter how well you communicate, some people may still not be satisfied.
- Avoid technical language and jargon. Use vivid, concrete images that communicate on a personal level. People in the community are often more concerned about such issues as credibility, competence, fairness, and compassion than about statistics and details.
- Employ your best listening skills. Take time to find out what people are thinking, rather than assuming that you already know.
- Different audiences require different communication strategies.
- Involve school employees. An informed staff is likely to be a supportive staff.
- Involve parents. Let them know about what is being done and why, as well as what will happen if problems are detected.
- Emphasize action. Always try to include a discussion of actions that are

underway or that can be taken.

- Encourage feedback. Accentuate the positive, and learn from mistakes.
- Our goal is to keep the public informed. Strive to stimulate community interest. Be reasonable, thoughtful, solution-oriented, and collaborative.
- Be prepared for many questions. Provide background material on complex issues. Avoid public conflicts or disagreements between credible sources.
- Be responsive. Acknowledge the emotions that people express and respond in words and actions. When in doubt, lean toward sharing more information, not less, or people may think you are withholding something.
- Tell people what you can and cannot do. Promise only what you can do and do what you promise.

### Who Will Investigate & Solve Major Problems?

In most cases, Environmental Compliance staff can solve IEQ problems.

The use of in-house staff builds IEQ knowledge and skills that will be helpful in minimizing and



resolving future problems. The investigative techniques identified in the following pages will be helpful in identifying the possible causes and solutions to IEQ problems. On-the-other-hand, unique or complex IEQ problems may be best handled by professionals who have specialized knowledge, experience and equipment. The Environmental Compliance Department will be responsible for determining the severity of a given problem and assigning remedial actions to inside or outside professionals.

Independent of whether we utilize in-house staff or outside assistance to diagnose and solve an IEQ problem, the Environmental Compliance Department will also function as the record keeping and communication center and will provide information to interested parties.

The flow chart on page 25 of Section 4 depicts how IEQ concerns will be addressed.

### Solving IEQ Problems

The purpose of this section is to provide an understanding of the basic principles of IEQ problem solving. This guidance can be helpful in selecting a mitigation strategy, and in evaluating the practicality and effectiveness of proposals from in-house staff or outside professionals.

Selection of a solution, or combination of solutions, is based on the data gathered during diagnostics, as

outlined in the previous section. The diagnostics may have determined that the problem was either a real or a perceived IAQ problem, or a combination of multiple problems. For each problem that the diagnostics identify, develop a solution using the basic control strategies described below. There are **four basic control method groups** for lowering concentrations of indoor air pollutants. Often only a slight shift in emphasis or action using these control methods is needed to more effectively control indoor air quality.

### A. SOURCE MANAGEMENT

Source Management includes source removal, source substitution, and source encapsulation. Source management is the most effective control method when it can be practically applied. This means chemicals should be stored in designated areas with appropriate ventilation and that chemicals are used in appropriate areas using prescribed procedures.

1. **Source removal** is very effective. However, procedures and actions that keep potential pollutants from entering the school are even better at preventing IEQ problems. Other examples of source removal include not allowing buses to idle near outdoor air intakes, not placing garbage or chemicals in rooms where HVAC equipment is located, and banning

smoking within the school.

2. **Source substitution** includes actions such as selecting a less toxic art material or interior paint than the products that are currently in use, if possible.



3. **Source encapsulation** involves placing a barrier around the source so that it releases fewer pollutants into the indoor air supplied to building occupants.

### B. LOCAL EXHAUST AND VENTILATION

1. **Local exhaust** is very effective in removing point sources of pollutants before they can disperse into the indoor air by exhausting the contaminated air outside.
2. **Ventilation** using clean (outdoor) air to dilute the polluted (indoor) air that people are breathing is an effective method of dealing with CO<sub>2</sub> and other chemicals that may

accumulate in occupied areas. The ventilation system, when properly designed, operated, and maintained, will automatically take care of “normal” amounts of air pollutants. For emergency situations, such as the quick removal of toxic fumes, increased ventilation can be useful, but when considering long term operating costs, employing “dilution as the solution” is best applied after attempts to reduce the source of the pollutant have failed.

### C. EXPOSURE CONTROL

Exposure control includes adjusting the time, amount, and location of chemical usage to reduce exposure.

1. **Time of use.** Try not to use a pollutant source when the school is occupied. For example, strip and wax floors on Friday after school is dismissed, so that the floor products have a chance to off-gas over the weekend, reducing the level of pollutants in the air when the school is reoccupied on Monday.
2. **Amount of use.** If less of an air-polluting source can be used, then less will end up in the air



resulting in a lower potential for IEQ problems.

3. **Location of use.** Move the polluting source as far as possible from occupants, or relocate susceptible occupants when arrangements cannot be made to use these products during unoccupied periods.

**Note:** Education of the school occupants is critical. If people are provided information about the sources and effects of pollutants in their control, and about operation of the ventilation system, they can act to reduce their personal exposure.

**D. AIR CLEANING** Air Cleaning primarily involves the filtration of particulates from the air as it passes through the HVAC equipment. Gaseous pollutants can also be removed; however, this must be engineered on a case-by-case basis.

### Evaluating the Practicality of a Solution

To help ensure a successful solution, mitigation efforts should be evaluated at the planning stage by

considering the following criteria:

- Performance
- Operating Principle
- Control Capacity
- Ability to Institutionalize the Solution
- Durability
- Installation and Operating Cost
- Conformity with Codes
- Impact on IEQ

**Performance** Mitigation efforts that create permanent solutions to indoor environmental problems are clearly superior to those that provide temporary solutions, unless the problems are also temporary. Opening windows or running air handlers on full outdoor air may be suitable mitigation strategies for a temporary problem such as off gassing of volatile compounds from new furnishings, however, they are not acceptable permanent solutions due to increased energy costs. A permanent solution to microbiological contamination involves not only cleaning and disinfection, but also modification of the environment to prevent re-growth.



**Operating Principle** The most economical and successful solutions to IEQ problems are those that can be implemented by school based personnel. If a specific point source of contaminants has been identified, treatment at the source by removal, sealing, or local exhaust is usually a more appropriate correction strategy than

dilution of the contaminant by increased general ventilation. If the IEQ problem is caused by the introduction of outdoor air that contains contaminants, then increasing the outdoor air supply will only make the situation worse, unless the outdoor air being supplied is cleaned prior to entering the building.

**Control Capacity** It is important to select a solution whose size and scope fit the problem. If odors from a special use area such as kitchen are causing complaints in nearby classrooms, increasing the ventilation rate in the classrooms may not be successful. If mechanical equipment is needed to correct the IEQ problem, it must be powerful enough to accomplish the task. For example, a local exhaust system should be strong enough and close enough to the source so that the contaminant moves out of the building. Keep in mind that exhaust systems have the capability of creating negative pressures, which may contribute to moisture vapor infiltration. Care must also be taken to ensure that enough outside air is introduced into the space to compensate for exhaust fans and that the air is conditioned if necessary before it is introduced into the building.

**Ability to Institutionalize the Solution** A solution will be most successful when it is institutionalized as part of normal building operations. Solutions that do not require exotic equipment are more likely to be successful in the end than approaches that



involves unfamiliar concepts or delicately maintained systems. If maintenance or housekeeping procedures or supplies must change as part of the solution, it may be necessary to provide additional training, new inspection checklists, or modified purchasing practices. Operating and maintenance schedules for heating, cooling, and ventilation equipment may also need modification.

**Durability** IEQ solutions that are durable are more attractive than approaches that require frequent maintenance or specialized skills. New items of equipment should be quiet, energy efficient, and durable, so that the operators are encouraged to keep them properly running.



**Installation and Operating Costs** The approach with the lowest initial cost may not be the least expensive over the long run. Other economic considerations include energy costs for equipment operation; increased staff time for maintenance; differential cost of alternative materials and supplies; and higher hourly rates if odor-producing activities such as cleaning must be scheduled for unoccupied periods. Although these costs will almost certainly be less than the costs of letting the problem continue, they are more readily identifiable.

Therefore, it is important to ensure that all parties understand the cost avoidance benefits associated with remedial actions.

**Conformity with Codes** Any modification to building components or mechanical systems must be designed and installed in keeping with applicable fire, electrical and other building codes.

### Impact on IEQ

Will the remediation produce new IEQ problems? (i.e. Negative pressures created by an exhaust fan installed to eliminate chemical odors at the source)

Two kinds of indicators can be used to evaluate the success of an effort to correct an indoor environmental problem:

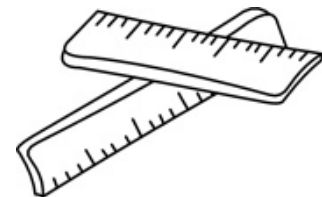
1. Reduced complaints
2. Measurement of the properties of the indoor air

Reduction or elimination of complaints appears to be a clear indication of success, but that is not necessarily the case. Occupants who realize that their concerns are being heard may temporarily stop reporting discomfort or health symptoms, even if the actual cause of their complaints has not been corrected. Lingering complaints may also continue after successful mitigation if people have become upset over the handling of the problem. A smaller number of ongoing complaints may indicate that there were multiple IEQ problems and

that one or more problems are still unresolved.

Measurements of airflow, ventilation rates, and air distribution patterns can be used to assess the results of control efforts. Airflow measurements taken during the building investigation can identify areas with poor ventilation; later they can be used to evaluate attempts to improve the ventilation, air distribution, or direction of flow. Studying air distribution patterns may show whether a mitigation strategy has successfully prevented a pollutant from being transported by airflow. In some cases, the measurement of pollutant levels can be used as a means of determining whether indoor air quality has improved.

In many cases, this may be difficult and/or prohibitively expensive. Concentrations of indoor air pollutants typically vary greatly over time; further, the specific contaminant measured may not be causing the problem. Measurement of a specific pollutant by a professional is appropriate if the problem was isolated to that pollutant. *The Environmental Compliance Department will determine whether to test for pollutants on a case-by-case basis.*



Even the best-planned investigations and mitigation actions may not resolve a

problem. Careful investigation may have found one or more apparent causes for the problem with proper controls implemented. Nonetheless, the correction strategy may not have caused a noticeable reduction in the concentration of a contaminant or improvement in ventilation rates or efficiency. Further, the complaints may persist even though we have been successful at improving ventilation and controlling all of the contaminants identified in the investigative phase. When source control options have been pursued along with increased ventilation rates and efficiency to the limits of the district's expertise, further analysis may be needed to determine next steps.

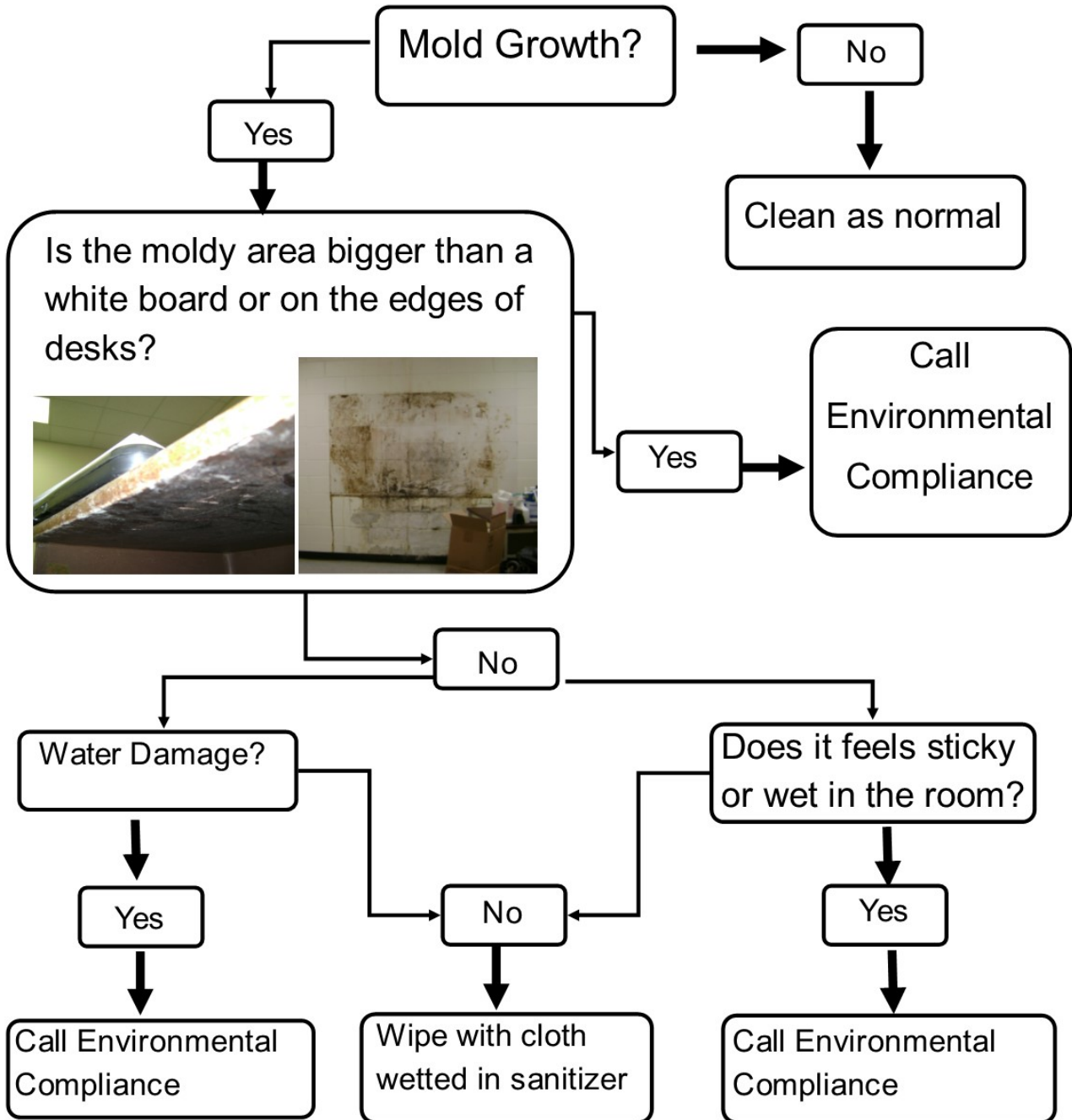
## Untraditional IEQ Complaints

Ergonomic factors such as lighting deficiencies or localized sources of noise or vibration can sometimes be readily identified, and remedial action may be fairly straightforward, such as having more or fewer lights, making adjustments for glare, and relocating, replacing, or acoustically insulating a noise or vibration source. Similarly, some causes of ergonomic or psychological stress may be apparent even to an untrained observer. In other cases, where problems may be more subtle or solutions more complex, enlist the services of the Environmental Compliance Department.

## Persistent Problems

If several unsuccessful efforts to control a problem have been made, the Environmental Compliance Department will determine if it is advisable to seek outside assistance. The problem may be complex, and it may occur only intermittently or cross the borders that divide traditional fields of knowledge. It is even possible that poor indoor environmental quality is not the actual cause of the complaints. Bringing in a new perspective at this point can be very effective.

## Custodial Guide to Cleaning Mold Growth



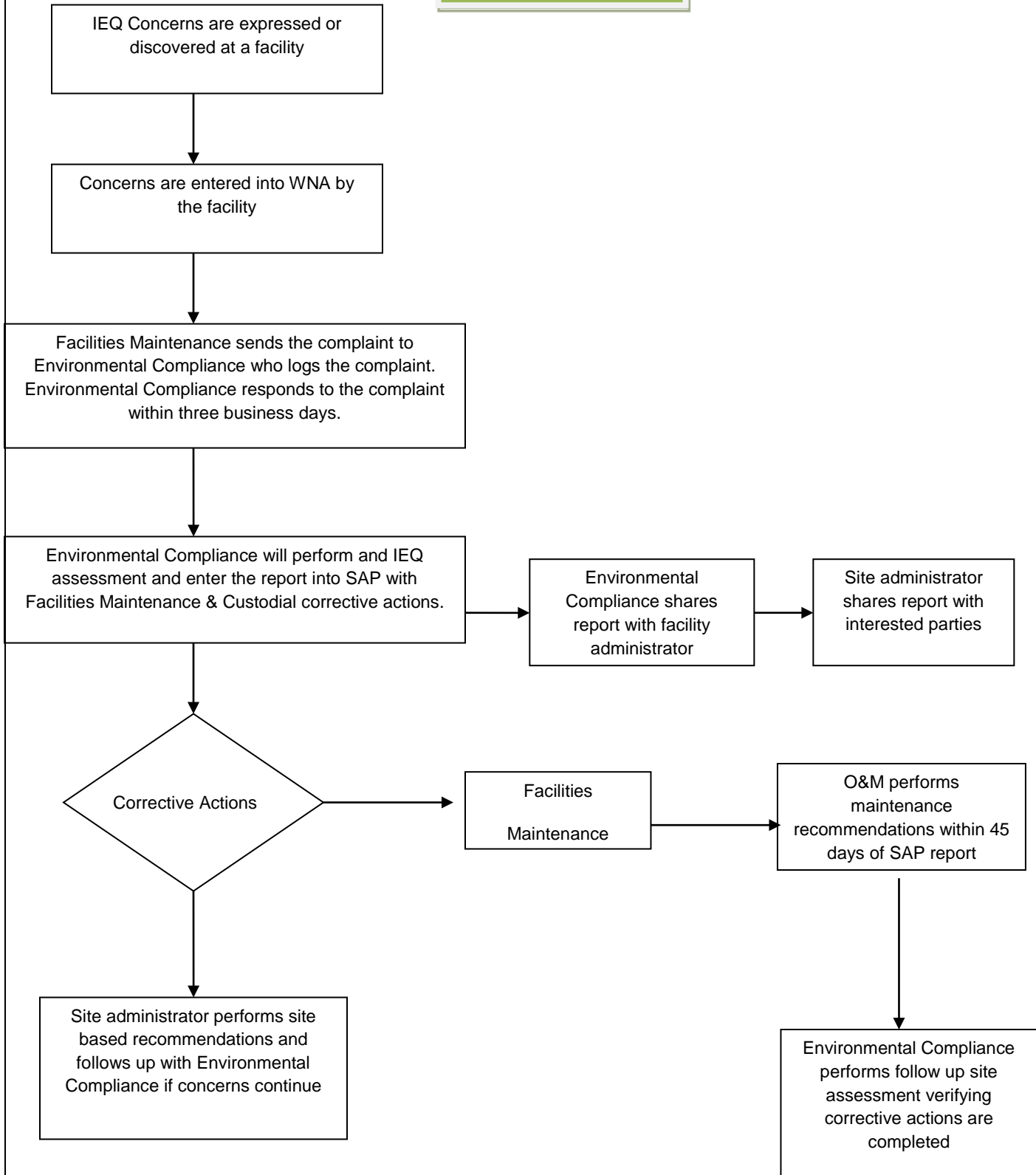
Used cloths can be washed as normal and reused. If the mold comes back, call us:

**Environmental Compliance**

**407-317-3945**

**[environmentalaffairs@ocps.net](mailto:environmentalaffairs@ocps.net)**

# IEQ Flow Chart



5

IEQ Related  
Programs



## Asthma-Friendly Schools Initiative

The Asthma Friendly Schools Initiative provides a framework and tools that communities and schools can use to work together on a comprehensive approach to asthma management, including planning tools, policy recommendations, and education programs.

<https://www.lung.org/lung-health-and-diseases/lung-disease-lookup/asthma/asthma-education-advocacy/asthma-friendly-schools-initiative/>



FLORIDA ASTHMA COALITION

## Asthma-Friendly Schools

To support the academic performance and improve the health status of students with asthma in Florida, FAC established the Asthma-Friendly Schools Recognition with the support of local, state and academic partners.

With the goal of improving student health, attendance, and academic achievement, the Florida Asthma Coalition established a voluntary recognition opportunity to acknowledge schools with exceptional asthma management programs. The Florida Asthma Coalition recognized the long-term impact of academic success and the link between health and academics. Academic success is a key indicator of the overall well-being of students and a primary predictor and determinant of adult health outcomes.

<https://floridaasthmacoalition.com/schools-childcare-centers/asthma-friendly-schools/>



## Indoor Air Quality Tools for Schools Action Kit

*IAQ Tools for Schools* Action Kit shows schools how to carry out a practical plan to improve indoor air problems at little- or no-cost using straightforward activities and in-house staff. The Kit provides:

- best practices
- industry guidelines
- sample policies
- a sample IAQ management plan

<https://www.epa.gov/iaq-schools/indoor-air-quality-tools-schools-action-kit>