

**DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
POLICY AND PROCEDURES MANUAL**

INDOOR AIR QUALITY

P&P C-48

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AUTHORITY: California Labor Code §§6300 et seq., and Title 8 California Code of Regulations §§332.2, 332.3, 336, 3203, 3362, 5141 through 5143, 5155, and 14301.

POLICY: It is policy of the Division of Occupational Safety and Health to investigate all complaints or referrals alleging that workplace indoor air quality (IAQ) is injurious to the health of building occupant-employees, or a report of a fatality, serious injury or illness, or serious exposure involving workplace IAQ.

PROCEDURES:

I. COMPLAINT AND REFERRAL PROCESSING PROCEDURES

A. Non-Industrial Work Environments

1. Most complaints about the quality of indoor air arise from employees who work in non-industrial environments. However, hazardous exposures in these work environments are often difficult to evaluate. Approaches using traditional industrial hygiene sampling techniques usually demonstrate compliance with 8 CCR §5155 permissible exposure limits (PELs) despite the persistence of IAQ complaints from the building occupants.
2. The procedures found in this P&P are primarily designed to address the investigation of IAQ complaints from non-industrial work environments, such as offices, educational facilities, retail and other commercial establishments, healthcare facilities, as well as enclosed spaces that are a part of industrial work environments, e.g., administrative or front office areas, employee cafeterias, and employee lounges or break rooms.

B. IAQ Complaints and Referrals

1. Initial Complaint Evaluation by District Manager
 - a. Intake Evaluation

All IAQ complaints received by the District shall be carefully evaluated by the District Manager to determine whether the complaint is valid.

NOTE: IAQ complaints can be taken by District Office Support Staff, but only after they have been trained by the District Manager in the Complaint Processing Procedures found in P&P C-7 and C-48.

b. Validity

A valid IAQ complaint is a complaint which alleges that indoor air in an industrial or in a non-industrial work environment is hazardous to the health of a building occupant-employee(s).

c. Intake Guidelines

1. Many IAQ complaints from non-industrial work environments allege that the indoor air is "uncomfortable," but fail to allege a condition that amounts to a health hazard.

For instance, if a complainant alleges that the indoor air temperature is uncomfortable but the District Manager judges that the indoor air temperature is not in a range known to produce thermal stress, then the complaint should not be categorized as a valid Cal/OSHA complaint.

NOTE: Complaints about the temperature of a place of employment can be referred to the Division of Labor Standards Enforcement. See 8 CCR §11040 (Wages, Hours and Working Conditions), Item 15, Temperature, found in Appendix B to the California Labor Code.

However, care shall be taken by the District Manager to properly evaluate the validity of all IAQ complaints since even comfort complaints may indicate a serious IAQ problem.

2. The following questions may be of assistance in determining the nature and degree of seriousness of an IAQ complaint:
 - a. What is the nature of the IAQ problem? Can you describe the exposure or unhealthful condition?
 - b. How long has the condition been present and is it a regular occurrence in your workplace?
 - c. Have you noticed that the IAQ problem occurs in association with anything else in the workplace?
 - d. What are the symptoms, if any, of the affected employees? Has anyone been out of work because of the IAQ problem and how long have they been out? Has any affected employee sought medical attention, and, if so, did the health care provider identify the problem?
 - e. What specific areas of the workplace are affected by the IAQ problem, and what type of work is performed there?
 - f. How many employees are there in the affected work area and how many of them have been affected by the IAQ problem? What are the shifts of the affected employees and when do the shifts begin?
 - g. Has the IAQ problem been brought to the employer's attention? If so, has the employer identified the condition and has the employer made any attempts to correct the IAQ problem?
 - h. Do you know whether other government agencies besides Cal/OSHA have been contacted?
 - i. Is there an employee representative in the affected workplace that Cal/OSHA can contact?
- d. When the District Manager categorizes an IAQ complaint as not valid, the District Manager shall direct the complainant to one or more of the following sources of assistance:
 1. The person with the authority and responsibility for the Injury and Illness Prevention (IIP) Program in the complainant's particular workplace;
 2. The complainant's employer or supervisor; or
 3. The manager or owner of the building which the complainant occupies.

In addition, the District may provide these sources of assistance with any appropriate IAQ resource materials available from the Cal/OSHA Consultation Service.

2. Complaint Referrals

a. Referral To Another State or Local Government Agency or Private Sector Entity

After initial evaluation by the District, the following types of IAQ complaints shall be referred to another state or local government agency, or private sector entity, for investigation:

1. Environmental Tobacco Smoke (ETS)

a. Places of Employment Covered by State or Local Anti-Smoking Law or Ordinance

- i. Complaints alleging ETS exposure in places of employment covered by a state or local anti-smoking law or ordinance shall be telephonically referred by the District to the appropriate local government entity which has the responsibility for enforcement of the state or local anti-smoking law or ordinance.
- ii. A telephone number for local agencies which enforce state and local anti-smoking laws or ordinances shall be provided to the complainant by the District.

NOTE: Each District Office shall maintain a current list of telephone numbers of local agencies with the responsibility for enforcing state or local anti-smoking laws or ordinances.

b. Places of Employment Not Covered by State or Local Anti-Smoking Law or Ordinance

Complaints alleging ETS exposure in places of employment not covered by a state or local anti-smoking law or ordinance shall be investigated by utilizing a letter to the employer with notification to the complainant. See Attachments A and B.

2. Pesticide Exposure

Complaints alleging pesticide exposure in an indoor workplace environment shall be referred to the local County Agricultural Commissioner for investigation.

3. Radiation Exposure Complaints

a. Ionizing Radiation

Complaints alleging exposure to any type of ionizing radiation, including radon exposure in the home environment, shall be referred to the Radiologic Branch of the California Department of Health Services (CDHS).

NOTE: In Northern California, notify CDHS at (510) 540-2014, and in Southern California, notify CDHS at (213) 620-2860.

b. Nonionizing Radiation

For complaints alleging low frequency electromagnetic field (EMF) radiation exposure, a referral shall be made to the appropriate electric energy supplier's customer service department.

NOTE: 8 CCR §5085 regulates exposure to radiofrequency and microwave radiation.

4. Air Quality Management District (AQMD)

Complaints alleging a violation of a local AQMD regulation, e.g., odors from an adjacent automobile

paint shop, shall be referred to the appropriate AQMD office.

5. Natural Gas/LPG/CNG Complaints

Complaints alleging an uncontrolled release of natural gas, liquified petroleum gas (LPG) or compressed natural gas (CNG) shall be immediately referred to the appropriate local fire department.

b. Referral To Medical Unit

1. Mandatory

The District shall make a referral to the Medical Unit requesting assistance prior to initiating an investigation of any serious IAQ complaint. See Section I.B.3.b. for definition of serious IAQ complaint.

2. Discretionary

The District may make a referral to the Medical Unit requesting assistance prior to an investigation of any nonserious IAQ health complaint. See Section I.B.3.a. for definition of nonserious IAQ complaint.

NOTE: When investigating a nonserious IAQ health complaint involving a large number of symptomatic occupant-employees, i.e., greater than 20% of the building occupant-employees, or health complaints which are recurring and/or worsening in severity, the District should consider requesting Medical Unit assistance.

c. Referral Procedures

1. When a referral is made to another state or local government agency, compliance personnel shall complete a Cal/OSHA Form 90.
2. When a referral is made to the Cal/OSHA Medical Unit or Epidemiology Unit, compliance personnel

shall complete a Medical Unit Services Request Form (Cal/OSHA Form 90M). See P&P C-90.

NOTE: When completing a Cal/OSHA Form 90M to request Medical Unit or Epidemiology Unit Services, compliance personnel shall indicate the number of employees who are ill, the number of potentially affected employees, suspected exposures, characteristics symptoms, cases diagnosed by health care professionals and the specific type of medical services requested.

3. IAQ Complaint Classification
a. Nonserious

The following types of IAQ complaints shall generally be considered nonserious:

1. HVAC System Complaints

A complaint alleging malfunction of a building's heating, ventilation and air- conditioning (HVAC) system shall generally be considered nonserious.

2. Particulate Complaints

A complaint alleging that IAQ is hazardous because of large quantities of non-specific airborne particulates, dust or debris shall generally be considered nonserious.

3. Thermal Stress Complaints

A complaint alleging that the indoor air temperature is in a range which is uncomfortable, but which will not result in thermal stress, shall generally be considered nonserious.

4. Nonserious Health Complaints

Complaints alleging IAQ health hazards are often characterized by a number of nonspecific symptoms,

including fatigue, headache, dizziness, odor annoyance, skin problems, and eye, nose, throat and chest irritation. The occurrence of these symptoms among many workers in a particular office building has been labeled "Sick Building Syndrome."

A complaint alleging that indoor air is producing nonspecific health effects, such as those mentioned above, or those health effects attributed by the complainant to ETS exposure, shall be considered nonserious when the symptoms:

- a. Occur intermittently;
 - b. Are not strongly associated temporally with building occupancy;
 - c. Affect less than five (5) building- occupants; and
 - d. Have not resulted in the complainant or those affected seeking medical attention or incurring any lost workdays.
- b. Serious

The following types of IAQ complaints shall generally be considered serious:

NOTE: The District may request Medical Unit assistance in making a determination whether a IAQ complaint is serious. If it is determined that the IAQ complaint is serious, the District shall request prior Medical Unit assistance prior to initiating the investigation of the complaint.

1. Building-Related Illness
 - a. A complaint alleging that a building occupant-employee is suspected of, or has been diagnosed by a physician as having, a specific building-related illness shall be considered serious.
 - b. Common building-related illnesses include the following:
 - i. Infections, such as Legionnaire's disease and Pontiac fever; and

NOTE: A complaint alleging tuberculosis exposure shall be addressed according to the procedures found in P&P C-47.

- ii. Hypersensitivity diseases, such as hypersensitivity pneumonitis, including humidifier fever, building- related asthma and rhinitis.
 - c. Where appropriate, investigation of a complaint of building-related illness should be coordinated with the local health department.
2. Clusters of Cancer Cases, Difficulty in Conceiving or Adverse Birth Outcome Cases

A complaint alleging that a building occupant-employee is suspected, or has been diagnosed by a physician, as having IAQ-related cancer, difficulty in conceiving or an adverse birth outcome shall be considered serious. A complaint of cancer or adverse birth outcome cases shall be coordinated by the Medical Unit with the Epidemiology Unit, the local health department and with the California Department of Health Services.

3. Serious Health Complaints

A complaint alleging that the indoor air is producing nonspecific health effects, including Sick Building Syndrome, or those health effects attributed by the complainant to ETS exposure, shall be considered serious when the symptoms:

- a. Occur on a regular basis;
 - b. Are strongly associated temporally with building occupancy;
 - c. Affect more than five building- occupants; and
 - d. Have resulted in the complainant(s) seeking medical attention and/or incurring lost workdays.
4. Coordinated IAQ Investigations

After the opening conference, compliance personnel shall determine whether it is necessary to evaluate the HVAC system. If HVAC system evaluation is determined to be necessary, effective evaluation may require coordination with appropriate personnel representing HVAC system management.

a. State of California Buildings

For buildings owned and/or managed by the State of California, HVAC system evaluation may be coordinated with appropriate personnel from the State of California Department of General Services (DGS).

b. Other Than State of California Buildings

For other buildings, HVAC system evaluation may be coordinated with appropriate personnel representing building HVAC system management.

C. II. IAQ INVESTIGATION PROCEDURES

A. Interviews

1. Employers, Building Managers or Owners

a. Appropriate employers whose employees have been exposed to the IAQ hazard under investigation shall be interviewed in addition to the manager and/or owner of the building in which the exposed employees work.

b. During the interview, the following issues shall be addressed with employers, building managers or owners:

1. Availability of blueprints of the building, including blueprints of the HVAC system;
2. Date building permit was issued and date building was built;
3. Number and distribution of building occupants, and number and distribution of complaining or ill building- occupants;
4. Identification of the person responsible for the HVAC system's operation and maintenance:

5. Information about past or present building-related IAQ problems;
6. Opinion about what is causing the building-occupants' complaints; and
7. For employers only, awareness of employees' complaints about building-related IAQ problems, actions taken to investigate IAQ complaints, and IIP Program provisions pertaining to investigation of workplace hazards.

2. Occupant-Employees

- . Number of Interviews To Be Conducted

Interviews with large numbers of building occupant-employees is not an efficient use of compliance resources. Rather, compliance personnel shall conduct interviews with a representative number of occupant-employees who have been exposed to the IAQ hazard under investigation and who are either symptomatic or non-symptomatic.

a. Scope of Occupant-Employee Interviews

The scope of occupant-employee interviews shall be limited to screening for the following and shall not include other types of symptom surveys:

- o. Relevant symptom history;
 1. Relationship of symptoms to building occupancy;
 2. History of lost workdays and/or medical treatment; and
 3. What the occupant-employee believes to be the cause of the IAQ problem.

b. Occupant-Employee IAQ Interview Form

- o. An Occupant-Employee IAQ Interview Form for use by compliance personnel can be found in Attachment C.
 1. If additional medical information pertaining to a particular occupant-employee's medical history is needed, consider a referral to the Medical Unit.

3. On-Site Maintenance Personnel

Any on-site personnel who are responsible for maintaining the quality of the indoor air environment, including maintenance of the HVAC system, shall be interviewed. Use the HVAC System Maintenance Personnel Interview Form in Attachment D.

B. HVAC System Evaluation

o. HVAC Maintenance Personnel Interview

Person(s) who are responsible for inspection, operation, and maintenance of the building's HVAC system, shall be identified and interviewed to determine if the building's HVAC system is being inspected, operated and maintained properly. Use the HVAC System Maintenance Personnel Interview Form in Attachment D.

1. HVAC Maintenance Records Review

Examination of HVAC system's inspection, operation and maintenance records shall be conducted in conjunction with an interview of HVAC system maintenance personnel. During the evaluation, if the maintenance records are not kept on-site, a copy of the records shall be requested by compliance personnel.

2. HVAC System Inspection

- When appropriate, compliance personnel shall conduct a physical inspection of the HVAC system to determine if the HVAC system is being inspected, operated and maintained properly.

NOTE: Prior to initiating a physical inspection of a building's HVAC system, compliance personnel shall take appropriate protective precautions to minimize exposure to themselves and to building occupants. If any questions arise about what personal protective precautions are appropriate, compliance personnel shall consult with the District Manager and, if necessary, the Regional Senior Industrial Hygienist.

a. Physical inspection of a building's HVAC system shall include, but shall not be limited to, the following steps:

- o. Observe any air pressure differences in the building. The interior of most buildings with a central HVAC system are maintained at a slight positive pressure relative to the outside air pressure. Gross pressure differences may indicate an imbalance in the HVAC system.
1. Assess the condition and location of the outside air intake (OAI) louvers, air filters and protective screens.
2. If appropriate, measure the outside air (OA) flow and exhaust air flow rates;

NOTE: Minimum ventilation rates found in the California Energy Code (24 CCR Part 6 Section 121) range from 0.15 cfm/ft² to 1.50 cfm/ft². These rates apply to new construction only, but can be used as a general guideline for existing facilities See Attachment E for California Energy Code Minimum Ventilation Rates.

3. Measure carbon dioxide (CO₂) concentration in areas of the indoor air environment, as appropriate, if such areas have been identified through occupant-employee interviews as "stuffy," "close," or "stifling."
4. Assess drip pans, accessible air ducts, and duct wrapping for signs of water condensation problems. Look for signs of biologic contaminant growth and verify the appropriate use of biocides;
5. Assess HVAC system fan controls or records reflecting fan control operations. Make sure the date and time of the time clock is accurate and that two to three outside air changes are being supplied prior to the building being occupied in the morning; and

6. Assess the condition of supply diffusers, return air vents, and the building's outside air intakes and exhausts.

C. Air and Bulk Sampling

o. General Policy Guidelines

Indoor air measurements can be classified generally into two categories: measurement of ventilation efficiency and measurement of the concentration of specific indoor air contaminants.

. Air Flow Rate

Ventilation efficiency is commonly assessed by measuring air flow rates at various places in the indoor air environment. See Section II.B.3.b.

a. Air Contaminant Sampling

Most complaints about the quality of indoor air arise from employees who work in non- industrial environments. Hazardous exposures in these work environments are often difficult to evaluate. Approaches using traditional industrial hygiene sampling techniques often demonstrate compliance with 8 CCR §5155 permissible exposure limits (PELs) despite the persistence of IAQ complaints from the building occupants.

Measurement of the concentration of specific indoor air contaminants can be classified into substance sampling for gases, vapors, and airborne particulates, and sampling for biological aerosols, or bioaerosols.

o. Gases, Vapors and Airborne Particulates

Measurement methods for gases, vapors, and particulates have been developed and validated for use in assessing compliance with permissible exposure limits (PELs). However, the concentrations of air contaminants found in non-industrial indoor air environments are

typically significantly less than the PEL for the substance, sometimes by several orders of magnitude. Therefore, establishing exposures in excess of the PEL is not a reasonable goal of indoor air quality sampling. When considering measurement methods, the sensitivity of the method is often more important than other concerns due to the very low concentrations encountered in indoor air environments.

1. Bioaerosols

Sampling for and analysis of bioaerosols, is a comparatively recent development in industrial hygiene. While the sampling techniques for bioaerosols are similar to those used for air contaminants, the analytical methods and conclusions which may be derived from these measurements are significantly different.

For one thing, ability of a biologic agent to multiply complicates consideration of the effect of concentration on health outcomes. Also, there are no biologic concentration standards or PELs against which to compare a particular bioaerosol sampling result. As a result, measurements of bioaerosols "inside" the building are usually compared to those "outside" the building or to a control building. All of these factors make supporting an association between exposure and effect more difficult than with air contaminants.

1. Air Sampling Criteria

. Air Contaminants

- o. The decision to sample for a specific air contaminant, e.g., particulates, including man-made fibrous materials and asbestos, volatile organic compounds or VOCs, including formaldehyde, or inorganic gases, such as CO, SO₂, or NO₂, can only be made after an initial investigation of the indoor air conditions

present in the subject workplace. The air contaminant to be sampled should be considered a highly probable cause of the adverse health effects experienced by the building occupant-employees and have an apparent source within the building before actual sampling is performed.

1. Potential sources for air contaminants in problem indoor air environments may include:
 - a. Building materials or furnishings, e.g., pressed wood furniture products, plastic piping, construction adhesives, insulating materials, and fabric, vinyl or plastic wall coverings;
 - b. Acoustic and thermal insulating material, ceiling tiles, and office partition panels;
 - c. HVAC system heating components, such as furnaces;
 - d. Garages which emit vehicular exhaust and contain stored chemicals like solvents and gasoline;
 - e. Combustion appliances such as unvented heaters, woodburning stoves and fireplaces;
 - f. Storage and application of cleaning solvents and consumer products;
 - g. Business machines, e.g., printers, copiers and computers; and
 - h. Outdoor air sources, such as emissions from nearby industrial activities, pesticide spraying, and vehicular exhaust.

NOTE: See Attachment F for a recommended Decision Logic for making an air contaminant sampling decision. If further guidance is needed, consult the Regional Senior Industrial Hygienist.

- a. Bioaerosols

Bioaerosols are usually introduced into the indoor air environment from the outdoor air. They lodge in areas of a building where moisture is present, such as in drip pans of the ventilation system, in wet walls, or in wet carpets. The bioaerosols then multiply in these areas and spread by air currents to other areas of the building.

The decision to sample the air for a particular biologic air contaminant, such as yeast, fungi, bacteria or viruses, can only be made after an initial investigation of the indoor air conditions present in the subject workplace and then shall only be undertaken under limited circumstances.

Bioaerosol air sampling shall be performed only when there is evidence that a source for bioaerosol exposure exists in the particular workplace or building occupant-employees have a medical condition which strongly suggests a building source. Without information indicating a source of biologic exposure, bioaerosol sampling is wasteful.

2. Air Sampling Procedures

- . Air Contaminants

The Cal/OSHA IH Technical Manual can serve as a reference for air contaminant procedures and analytical methods. Some modification to the methods found in the Manual may be necessary due to the low concentrations expected in most indoor air environments. These modifications will normally consist of increasing the sampling period to increase the likelihood of sampling intermittent excursions. Increasing the air flow sampling rate to achieve a larger total air volume per sample can also be done to obtain a sufficient sample, but increasing the air flow rate can affect the air contaminant concentrations.

See Attachment G for recommended IAQ Sampling and Analytical Methods for several common indoor air contaminants.

NOTE: If further guidance is needed, consult with the Regional Senior Industrial Hygienist or appropriate personnel at the Analytical Laboratory under to contract to the Division.

a. Bioaerosols

Site specific sampling for bioaerosols shall be developed with the assistance and concurrence of the Regional Senior Industrial Hygienist.

3. Bulk Sampling For Biologic Building Contaminants

In contrast to air sampling, bulk sampling for biologic material can be very useful and should be performed when indicated. Appropriate respiratory precautions shall be taken by compliance personnel when performing bulk sampling for biologic building contaminants.

D. Medical Assessment

o. Occupant-Employee Interview

. Triggers

Medical interviews with building occupant- employees shall be conducted by Medical Unit personnel during the course of an investigation of a serious IAQ complaint, or when asked by the District to assist in the investigation of a nonserious IAQ complaint.

NOTE: Medical Unit personnel shall work closely with compliance personnel when participating in IAQ investigations.

a. Scope

The scope of occupant-employee interviews performed by the Medical Unit shall be determined by Medical Unit personnel, and shall include, but not be limited to, the following items:

- o. Nature, frequency, duration and severity of symptoms;
- 1. Non-building associated medical history;

2. Relationship of symptoms to building occupancy and other environmental factors, such as recent construction, renovation, pesticide spraying, painting, and HVAC system problems;
 3. History of lost workdays and/or medical treatment;
 4. History of affected co-occupant- employees; and
 5. What the occupant-employee believes to be the cause of his/her IAQ associated problems.
1. Symptom Survey Questionnaire

Symptom survey questionnaires may be utilized by Medical Unit personnel under limited circumstances to assess the health status of building occupant- employees who are at the same risk of exposure to the IAQ hazard as the complainant.

2. Release of Medical Information

When necessary, Medical Unit personnel shall assist compliance personnel to obtain the release of medical information to the Division.

3. Medical Unit-Compliance Personnel Review

All findings generated during the course of an IAQ investigation involving Medical Unit personnel shall be summarized by the Medical Unit personnel and reviewed with district compliance personnel in a timely fashion.

D. III. CITATION PROCEDURES

A. Violation Determination

o. Guidelines

- . Whenever an employer is found to have inadequate procedures to maintain indoor air quality, 8 CCR §§3203, 3362, 5141, 5142, 5143, 5155, and/or 14301 shall be cited where appropriate according to the criteria below.
 - a. Each alleged violation shall identify the specific conditions which constitute the violation and the type

and location of the exposure source, if any, shall also be described.

- b. Special Orders and Orders to Take Special Action shall be utilized where appropriate, i.e., where a hazard cannot be adequately addressed by issuance of a citation.
 - c. Care must be taken to determine the extent to which the employer can control any IAQ problem which is to form the basis of a regulatory action by the Division. This determination should govern the manner in which an employer is directed to address an IAQ problem. For example, it may not be appropriate to cite an employer for problems related to the HVAC system if the employer is merely a tenant without control over the system, unless the violation is related to failure to notify the entity with control over the system of an IAQ problem, or failure to take other reasonable measures to address the problem. If an entity cannot be cited for problems related to the HVAC system, other appropriate action will be determined by the District Manager, in conjunction with the Regional Senior Industrial Hygienist.
- 1. Multiple Violations Pertaining to the Same Hazard

A particular IAQ hazard may in some cases violate provisions of more than one section of Title 8. If so, the citation shall allege each violation separately, and a penalty shall be proposed separately for each violation.

Consideration should be given to reducing penalties as provided by 8 CCR §336(k) where they arise from multiple violations based on the same specific hazard or violative condition.

B. Specific Title 8 Violations

o. §3362 -- General Sanitation Requirements

§3362 provides a basis for issuance of citations pertaining to general sanitation requirements. The following subsections are applicable to IAQ investigations:

- . Subsection (a)

Cleaning and maintenance of work environments, including building exteriors and environs, such that "harmful exposures" will be avoided.

a. Subsection (b)

Performance of cleaning and sweeping in such a manner as to minimize contamination of the air;

b. Subsection (c)

This subsection is not applicable to IAQ.

c. Subsection (d)

Proper storage of putrescible waste and refuse;

d. Subsection (e)

Removal of all sweepings, putrescible wastes, refuse, and garbage in such a manner as to avoid creating a menace to health due to unsanitary conditions;

e. Subsection (f)

Effective pest control.

NOTE: §5140 defines harmful exposure as an exposure to dusts, fumes, mists, vapors or gases: (a) in excess of any permissible limit prescribed by §5155; or (b) of such a nature by inhalation as to result in, or have the probability to result in injury, illness, disease, impairment, or loss of function.

1. §5142 -- Mechanically Driven HVAC Systems to Provide Minimum Building Ventilation

§5142 provides a limited basis for issuance of citations pertaining to HVAC system operation, inspection, and maintenance.

. Subsection (a)

o. Subsection (a)(1)

This subsection requires building HVAC systems to provide at least the quantity of outdoor air required by provisions of Title 24, California Administrative Code, which were in effect at the time the building permit was issued. This requirement is generally unenforceable because, in most cases, this information is unavailable to the employer. Thus, a special order will usually be the appropriate mechanism to require increases in the fresh air delivered by HVAC systems to eliminate an IAQ hazard.

1. Subsection (a)(2)

This subsection requires continuous operation of HVAC systems subject to enumerated exceptions.

a. Subsection (b)

This subsection provides for inspection and maintenance of HVAC systems, correction of problems found, documentation, and retention of records.

2. §5143 -- General Requirements of Mechanical Ventilation Systems

§5143 provides additional requirements applicable to mechanical ventilation systems. This section applies to both dilution and local exhaust ventilation.

. Subsection (a)

Subsection (a) provides general requirements applicable to the function of ventilation systems. Of particular relevance to IAQ problems is subsection (a)(1), which requires that harmful substances be exhausted out of the workplace in such a way as to avoid contaminating areas within the workplace.

a. Subsection (b)

Subsection (b) requires continuous operation of exhaust systems during all operations for which they are designed.

b. Subsection (c)

Subsection (c) is closely related to subsection (a)(1), and requires that exhaust systems discharge to outside air in such a manner as to avoid contamination of accessible work area. Recirculation of exhaust air is specifically permitted, provided that it does not result in harmful exposures. This provision can be used to cite for hazardous recirculation of exhausted air, which may arise from internal system design factors or external design factors, e.g., positioning exhaust air ducts too close to intake air ducts.

c. Subsection (d)

Subsection (d) includes several requirements. The first is the requirement to ensure that intake air is not contaminated by any outside source, whether created by the employer or not.

Subsection (d)(1) requires that delivery of outside air not diminish the effectiveness of local exhaust ventilation systems.

The remaining subsections deal with specific requirements related to ensuring the provision of adequate uncontaminated intake air, such as sealed duct joints where necessary; monitoring, cleaning, and replacement of filters; and measures to prevent combustion heating systems from contaminating indoor air.

3. §3203 -- Injury and Illness Prevention Program

§3203 requires an employer to establish, implement, and maintain an effective Injury and Illness Prevention (IIP) Program. The employer's IIP Program is not effective with

respect to IAQ hazards if any of the following circumstances exist:

- . Employees have complaints relating to IAQ which are not communicated to the employer because of a flaw in the employer's system for communicating with employees on matters relating to occupational safety and health (3203(a)(3));
- a. The employer fails to investigate ventilation system failures or IAQ-related health complaints (3203(a)(4) and/or (a)(5)); or
- b. The employer fails to take action to correct or otherwise appropriately resolve ventilation system failures or IAQ-related health problems (3203(a)(6)).

In most cases, these will be the only IAQ-related situations citeable as violations of §3203.

4. §5141 -- Control of Harmful Exposure to Employees

§5141 requires employers to prevent harmful exposures by means of appropriate engineering controls, administrative controls, and/or personal protection. This section has two basic applications. The first is to situations in which a PEL has been met without proper observance of the hierarchy of control measures listed in subsections (a), (b) and (c). The second, which is more relevant to IAQ problems, is to situations involving harmful exposure which is not chemical in nature.

For IAQ investigations, 5141 can be cited when no PEL exists for the hazard in question, but the employer has failed to prevent a non-chemical harmful exposure, e.g., exposure to airborne bacteria from improper HVAC system maintenance.

5. §5155 -- Airborne Contaminants

IAQ problems in non-industrial settings rarely involve exposures in excess of a PEL. Where they do, the contaminant is usually carbon monoxide or a solvent. If a

PEL has been exceeded, cite §§5155(c) and (e) as appropriate.

§5155(f) provides that a medical surveillance program approved by the Division may be required to ensure satisfactory maintenance of employee health and to ascertain the effectiveness of control methods used by employers. Thus, 5155(f) can be used to address IAQ problems where medical surveillance is appropriate. This is done by issuing an Order to Take Special Action pursuant to 8 CCR §332.3.

6. §14301 -- Cal/OSHA 200 Log

§14301 provides a basis for issuance of citations for failure to record work-related injuries and illnesses.

7. §332.2 -- Special Order

Issuance of a Special Order pursuant to §332.2 should be used to address recognized IAQ hazards requiring enforcement action which do not constitute violations of Title 8. All Special Orders shall be developed with the involvement of the Medical Unit and approved by the Chief or designee prior to issuance.

8. §332.3 -- Order to Take Special Action

Issuance of an Order to Take Special Action pursuant to 8 CCR §§332.3 and 5155(f) should be used in cases where medical surveillance is necessary to address recognized IAQ hazards requiring enforcement action. All Orders to Take Special Action shall be developed with the involvement of the Medical Unit and approved by the Chief or designee prior to issuance.

C. Violation Classification

IAQ violations shall be classified according to the provisions in 8 CCR §334. Generally, exposure to a substance above the applicable PEL and to a bioaerosol capable of causing death or serious physical harm will be classified as serious. See Labor Code §6432.

Attachments:

- A -- [Sample Notification](#) to Employer About ETS Exposure
- B -- [Sample Notification](#) to Complainant About ETS Exposure
- C -- Occupant-Employee Interview Form ([Cal/OSHA 48](#))
- D -- [HVAC Maintenance Personnel Interview Questionnaire](#)
- E -- [CA Energy Code Minimum Ventilation Rate Guidelines](#)
- F -- Decision Logic for Air Contaminant Sampling [EXAMPLE NOT AVAILABLE]
- G -- [IAQ Sampling and Analytical Methods](#)