

CHAPTER 30

INDOOR AIR QUALITY MANAGEMENT

3001. Discussion

a. Poor indoor air quality (IAQ) detracts from the quality of the work environment. Problems such as uncomfortable air temperature and humidity can decrease productivity. To increase the level of comfort and productivity in the work environment, make an effort to evaluate, maintain and improve IAQ.

b. Multiple causes of poor IAQ exist, any one of which could decrease the quality of the work environment. Some examples are:

(1) Unacceptable Humidity Ranges. Low humidity may lead to dryness and irritation of the nose, throat, skin and eyes. High humidity aids in the growth of certain molds. Susceptible individuals can experience allergic reactions to mold spores and particulate matter from the breakdown of mold protein.

(2) Insufficient Ventilation. Lack of sufficient fresh air leads to high carbon dioxide concentrations in work spaces. Lack of fresh air may cause fatigue, drowsiness, poor concentration and the sensation of temperature extremes without actual temperature changes. Increased CO₂ levels are an indicator of poor ventilation. Carbon dioxide levels are not correlated with other contaminant levels, but with the ability of the ventilation system to provide and circulate fresh air, dilute, remove and recirculate "stale" air. Reference 30-1 states that between 15 and 33 percent of the population will have symptoms when the level of CO₂ is between 600 and 800 parts per million (ppm). Between 33 and 50 percent become symptomatic between 800 and 1000 ppm, and virtually everyone will have some or all symptoms when the level is above 1500 ppm.

(3) Off-gas Chemicals. Many modern office furnishings and equipment off-gas chemicals. Adhesives, carpeting, upholstery, manufactured wood products, copy machines, pesticides and cleaning agents are examples of items that off-gas.

(4) Tobacco Smoke. Smoking and second hand smoke, otherwise known as environmental tobacco smoke (ETS), contribute to poor IAQ. According to the American Cancer Society, tobacco smoke contains more than 4,000 different chemical compounds, including about 43 carcinogens. ETS causes eye, nose and throat irritation; headaches; and bronchitis. In 1986, approximately 23,000 U.S. nonsmokers died from lung cancer. The U.S. Surgeon General attributed a substantial number of those deaths to ETS. In addition, ETS contributes to heart disease.

(5) Biological Contamination. Biological contaminants such as bacteria, molds, pollen and viruses may be present in stagnant water, air ducts, humidifiers and drain pans. Water-damaged material and insect and bird droppings contribute to biological contamination. Biological contaminants can trigger allergic reactions, some types of asthma and can cause some common infectious diseases.

(6) Combustion Products. Combustion products, such as carbon monoxide and nitrogen oxides can be released by vehicle exhaust, improperly burning furnaces, appliances and ETS.

(7) Building Modifications. Physical modifications within buildings usually generate dust. Improper isolation techniques can release asbestos, lead and other contaminants into the renovated building's ventilation systems.

c. Proper designs for new and renovated buildings precludes many IAQ problems. However, modified structures may experience heating, ventilating and air conditioning (HVAC) problems (e.g., HVAC not capable of providing adequate fresh air for new uses of the space).

3002. IAQ Investigation Approach

a. Individuals working in buildings with indications of poor IAQ shall report the problem(s) to their immediate supervisors. If the Navy maintains the building, the appropriate supervisor shall coordinate all contact with the designated facilities maintenance activity (e.g., public works center (PWC)/public works lead activity (PWLA), or first lieutenant) and the activity navy occupational safety and health (NAVOSH) manager. If the activity is unable to determine the cause of the problem, the NAVOSH manager shall request the cognizant industrial hygiene service to initiate an IAQ investigation. Reference 30-2 provides guidance on indoor air quality evaluations.

b. The Chief, Bureau of Medicine and Surgery (BUMED) Consultative Assistance Team (CAT) shall assist in IAQ investigations beyond the scope of the cognizant industrial hygiene service. BUMED will determine whether the problem is primarily health-related or engineering-related, or both and will request assistance from appropriate sources as needed (e.g., NAVFACENGCOCOM). Paragraph 0806 discusses CAT capabilities and functions.

c. If the building contains Navy personnel, but is maintained by a private enterprise, report the problem(s) to the appropriate facilities maintenance organization. If there is no solution, contact the NAVOSH manager and follow the process described in paragraphs 3002a and 3002b.

3003. Environmental Tobacco Smoke

a. A prime source of poor IAQ is environmental tobacco smoke. Many non-smokers find ETS offensive. The National Institute for Occupational Safety and Health (NIOSH) in reference 30-3 states that the preferable method to protect nonsmokers is the elimination of smoking indoors.

b. The Department of Defense (DoD) mandates smoke free workplaces in reference 30-4. U.S. Navy policy on ETS is to protect all personnel in working and public living environments from involuntary exposure to ETS. Navy activities shall:

(1) Prohibit smoking in all Department of the Navy (DON) vehicles, aircraft and work buildings. This applies to all Navy and Marine Corps (USMC) active duty, civilian personnel, their dependents and visitors in DON-controlled locations.

(2) Permit smoking only in individually assigned family and bachelor living quarters and in Navy lodge and USMC hostess house rooms designated for smoking except when a common HVAC system serves individual housing units. In such circumstances, commanding officers should make reasonable efforts to designate sufficient smoking quarters for smoking members. Do not recirculate air from smoking quarters with air entering nonsmoking quarters.

(3) Prohibit smoking in common spaces of multiple housing units (e.g., family housing apartment complexes, bachelor quarters, Navy lodges, USMC hostess houses, etc.). Any space within a building common to all occupants and visitors such as corridors, elevators, lobbies, lounges, stairways, rest rooms, cafeterias, snack bars, barber shops, laundry rooms, etc. is defined as common space.

(4) Not locate outdoor areas designated for smoking in areas commonly used by nonsmokers. Locate the smoking area away from supply air intakes and building entryways/egresses to prevent ETS entering the building.

c. The Federal Labor Relations Authority for Washington, D.C., in reference 30-5, has determined that unions could negotiate "hazardous duty" pay for those employees exposed to environmental tobacco smoke.

3004. Building Design and Maintenance

a. Activities can preclude many potential IAQ problems through proper planning in the design of new and renovated buildings. Single copies of reference 30-6 are available from NIOSH as publication 91-114. In addition, the EPA has established an IAQ Information Clearinghouse (1-800-438-4318).

b. Activities shall design and construct new and renovated buildings to meet the latest American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standards, references 30-7 and 30-8. Reference 30-7 specifies the conditions in which at least 80 percent of the occupants will find the environment thermally acceptable. Reference 30-8 specifies the minimum ventilation rates and recommends indicator levels for IAQ that should provide occupants with an acceptable level of comfort and minimize the potential for adverse health effects.

c. Activities shall ensure that building designs properly locate air intakes and exhaust vents or stacks during new and renovated building construction.

(1) Do not place fresh air intakes above loading docks. This avoids pulling truck exhaust and odor from dumpsters directly into the building. Place fresh air intakes on the prevailing wind side of the building.

(2) Place exhaust vents on the opposite side of the building from fresh air intakes. Do not locate intakes and exhaust vents in close proximity to each other.

(3) Extend all exhaust stacks or chimneys beyond the roof line of the building. They should attain sufficient height to ensure that exhaust gases release into the true airflow over the building. If located lower than the true airflow, exhaust gases could swirl at the edges of the building and be pulled back inside through a fresh air intake.

(4) Do not place caps over exhaust stacks or chimneys. Use bird and debris screens over all HVAC in-take and exhaust openings.

d. Building designers frequently use modular office systems to conserve space. These systems often block airflow to parts of the office. During the design and purchasing process, confirm that the modular office systems are compatible with the airflow patterns proposed by the

HVAC engineers. The ASHRAE standard (see reference 30-8) for offices of 20 cfm of fresh air/occupant is based on a maximum occupancy of seven people/1,000 square feet. The designer shall not reduce airflow where there are fewer than seven people. Increase airflow per the ASHRAE standard if the occupancy is greater than seven people/1,000 square feet.

e. Design new and renovated buildings to ensure HVAC systems are accessible for maintenance actions, especially preventive maintenance.

f. Personnel shall not make unauthorized modifications to the HVAC systems (e.g., by blocking off vents, cutting into duct work to create new vents, removing inspection panels and ceiling tiles, etc.). Personnel shall report ventilation problems according to the guidance given in Paragraph 3002.

g. Do not modify HVAC systems for energy conservation in such a way as to affect adequate air quality (e.g., sealing outdoor air intakes).

h. To help maintain good IAQ, commanding officers shall develop and implement effective programs of routine inspection and preventive maintenance of all HVAC systems and spaces.

3005. Responsibilities

a. Echelon Two and other headquarters commanders shall provide guidance and assistance to subordinate commands to ensure the effectiveness of this program.

b. BUMED shall:

(1) When appropriate, request that BUMED CAT be augmented by the Naval Facilities Engineering Service Center (NFESC) ventilation engineering personnel.

(2) Budget adequate resources for medical facilities to support this policy.

c. Commander, Naval Facilities Engineering Command (COMNAVFACENGCOM) shall:

(1) Augment BUMED CAT with NFESC ventilation engineers when requested.

(2) Ensure that building construction and modification plans reflect consideration of IAQ issues and comply with requirements described in paragraph 3004.

(3) Ensure that HVAC systems in new buildings meet the specifications in the ASHRAE standards contained in references 30-7 and 30-8.

d. Commanders, Commanding Officers and Officers in Charge shall:

(1) Establish smoke-free buildings and zones.

(2) Ensure that IAQ issues are considered in the design of new buildings.

(3) Coordinate with COMNAVFACENGCOM to ensure that new building design adheres to the ASHRAE standards contained in references 30-7 and 30-8.

(4) Develop and implement an effective program of routine inspections and preventive maintenance of all HVAC systems and spaces, including HVAC accessibility per paragraph 3004e.

(5) Ensure that employee concerns or complaints of IAQ problems are investigated and resolved in a timely manner using the procedures in paragraph 3002.

(6) Ensure HVAC systems meet paragraph 3004 requirements.

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References

- 30-1. AFOEHL Report 90-169CA00111KGA from Brooks, AFB. (NOTAL)
- 30-2. NEHC Technical Manual, Industrial Hygiene Field Operations Manual, latest revision
- 30-3. U.S. Department of Health and Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH) Publication No. 91-108 of June 1991, Current Intelligence Bulletin 54: Environmental Tobacco Smoke in the Workplace - Lung Cancer and Other Health Effects. (NOTAL)
- 30-4. DOD Instruction 1010.15 of 1 Feb 01, Smoke-Free DoD Facilities. (NOTAL)
- 30-5. SECNAVINST 5100.13B of 11 Feb 98, Navy and Marine Corps Tobacco Policy
- 30-6. Federal Labor Relations Authority, Case No. 0-NG-1947-1949 of 13 December 1991, Vol. 42. (NOTAL)
- 30-7. American Society of Heating, Refrigerating, and Air-Conditioning Engineers Standard ANSI/ASHRAE 55-1992 (with ANSI/ASHRAE Addendum 55a-1995), Thermal Environmental Conditions for Human Occupancy (NOTAL)
- 30-8. American Society of Heating, Refrigerating, and Air-Conditioning Engineers Standard ANSI/ASHRAE 62-1989 (with ANSI/ASHRAE Addendum 62a-1990, Ventilation for Acceptable Indoor Air Quality (NOTAL).
- 30-9. American Society of Heating, Refrigerating, and Air-Conditioning Engineers Standard 62-1989, *Ventilation for Acceptable Indoor Air Quality* (NOTAL)