STRATEGIES FOR IMPROVING IAQ

by John A. Tiffany

The major aims for improving IAQ should be a properly functioning and well maintained HVAC system and control of sources and processes generating contaminants. Many of the recommendations for improving IAQ listed below came from the National Institute for Occupational Safety and Health Hazard Evaluations and Field Studies teams. It is important to remember that a careful analysis of the IAQ problem is needed to ensure that the appropriate remedial actions are selected.

I. HVAC Systems. According to NIOSH, the single most effective method of correcting and preventing problems and minimizing complaints is to ensure an adequate outdoor air supply. A regularly scheduled preventive maintenance program and an HVAC system that is readily accessible for inspection and cleaning are also important factors in improving IAQ.

A. System Design and Operation.

- Check to ensure system is balanced.

- Ensure minimum of 15 cfm/person of outdoor air to occupied space.

- If system is not functioning on evenings or weekends, turn on unit at least several hours before work and leave on several hours after workday.

- Before any renovation work, inspect the proposed layout for any impact on HVAC system.

- After any renovation work, check the ventilation efficiency of system.

- If intakes are located too close to contaminants, either from building exhaust outlets or outdoor sources, consider relocating intake/exhaust or modifying usage.

- If intakes located too close to building stacks, raise stack

- If a specific space produces contaminants, return air for that space should be exhausted outdoors directly instead of being recirculated.

- Keep occupied space within ASHRAE standard 55R-1981 guidelines for temperature and relative humidity.

B. Filters.

- Regularly replace filters.

- Filters should be evaluated to see if moderate efficiency rating filters are needed to better filter out particulates and to protect various HVAC components (as opposed to low efficiency rating).

- Use pre-filters to protect a higher efficiency filter.

C. Bioaerosols.

- Clean coils and drain pans as needed.

- Make sure HVAC is off if cleaners/disinfectants are used in HVAC system and that disinfectant is cleaned off before reactivating unit.

- Prevent further accumulation of stagnant water through proper inclination and drainage of drain pans.

- Check liner in air handling units for accumulation of bioaerosols.

D. Maintenance.

- Check that diffusers are open and unobstructed in each space.
- Adjust diffusers so that occupants are not sitting in direct stream of air.
- Check that outdoor air supply louvers are open.
- Regular maintenance of mechanical equipment.
- Keep mechanical rooms clean and free of chemical storage.
- Consider installing gauges to monitor supply and return air flows.
- Make sure that all ceiling tiles are in place.
- Ensure that garbage dumpster is not located near air intake.
- Check thermostats to see if calibrated correctly

II. Air Contaminants. There are two main ways to deal with air contaminant sources: 1) remove or control them, and 2) dilute them by increasing the amount of outdoor (make-up) air. Both ways are often employed to achieve the best results.

A. Indoor Air Contaminant Sources.

- Use local exhaust to remove contaminants generated by specific processes.
- Apply pesticides only while building is unoccupied and also have HVAC system fully operational during the application; attempt to have 100% outside air if possible.
- Prohibit smoking in the building or designate a smoking area directly exhausted outdoors to avoid recirculating ETS.

- Substitute less toxic materials where ever possible.

- Have floor waxing and other high VOC emitter tasks done on weekends with HVAC system fully operational.

- Eliminate bioaerosols reservoirs, amplifiers and disseminators. - Discard any water damaged porous furnishings (carpets, ceiling tiles, upholstery); disinfection does not remove bioaerosols on these types of surfaces.

- Check that cleansers are properly diluted and applied.

- Check for dry traps if sewer gas odor (ammonia and hydrogen sulfide) is present, also check where waste-water pipe links up with water line.

B. Sources Generated During Renovations.

- Let new furnishings off-gas outside of building; i.e., condition the product before bring it into building or isolate product initially within building.

- Do any painting or applying of adhesives before indoor furnishings are installed to avoid the sink effect.

- If painting or working with any high emitters of VOC in occupied space during renovation:

  - Do not do work during regular working hours.

  - Make sure HVAC is operating during entire time period at an elevated percentage of outdoor air (100% is the best solution).

- Have HVAC system for that space separated from general HVAC system; have it vented directly outdoors.
- Cover all possible sinks (carpeting; ceiling tiles, etc.) with polyethylene sheeting or other physical barriers.

- Maintain high percentage of outdoor air for at least a few days after renovation and up to 3 months if possible in order to remove VOC from space (especially new buildings).

C. Outdoor Contaminants.

- Repair roof leaks and check other areas of building's structure.
- Make assessment when source is generated outside and modify HVAC system if necessary (during roof repairs, etc) or attempt to control source contamination (trucks not idling at loading docks, pesticides not sprayed during workday; etc.).
- Be aware if NAAQS standard warnings are issued for your area.