

LEGAL ISSUES IN INDOOR AIR QUALITY CONCERNING THE DESIGN PROFESSIONAL

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INTRODUCTION

The growing public awareness of indoor air quality issues during the past decade has been accompanied by an increasing number of lawsuits filed by office occupants, both office workers and office building tenant organizations. The complaints are usually filed against building owners, operators, design professionals, and contractors. Manufacturers and suppliers of building materials and equipment and office furnishings are also named in some suits. (Levin, 1989)

Often the law suits allege problems in ventilation caused, contributed to, or exacerbated by deteriorating indoor air quality resulting in the claimed injury. Mechanical engineers, mechanical contractors, HVAC system equipment manufacturers and suppliers, among others are sometimes named in the law suits.

Claims are made for damages from personal injury as well as business losses. In many of these suits, sick building syndrome (SBS) and building-related illness (BRI) are alleged outcomes of occupying the subject building. Sick building syndrome is defined as one or more of several symptoms including headache, dizziness, and difficulty concentrating; nausea; eye and skin irritation; upper respiratory irritation, shortness of breath, and cough; tightness of the chest and difficulty breathing; and reddening of the skin. Symptoms are usually worse in the suspect building and improve when the individual leaves the building. Building-related illness is one of several medical diagnoses associated with occupancy of a particular building and includes such illnesses as Legionnaire's Disease, Pontiac Fever, Hypersensitivity Pneumonitis, and Humidifier Fever. Building related illnesses are considered serious, even life threatening. SBS does occur in buildings without BRI, but BRI cases are usually accompanied by SBS.

Most of the lawsuits are settled before going to trial, but usually after considerable pre-trial fact-finding known as "discovery." Reports by expert witnesses and depositions of expert and factual witnesses are often made during this process. It is primarily from experience in the pre-trial phase of such suits that the author has identified and analyzed some common features for discussion in this paper.

The paper covers the following topics:

- a. Three Situations that Engender Lawsuits
- b. Why IAQ Lawsuits are Not Going to Trial
- c. Typical Arguments of Defendants and Defense Experts
- d. Legal Issues of the New Ventilation Standard, 62-1989

THREE SITUATIONS THAT ENGENDER LAWSUITS

Typically lawsuits related to SBS and BRI arise in three basic situations: during initial occupancy of new buildings; in buildings undergoing construction, renovation, or refinishing; and, in existing buildings where HVAC maintenance or operation are inadequate.

New Construction

New buildings contain products that normally emit considerable amounts of volatile organic compounds (VOC) from new building materials, finishes, and furnishings. Emission rates may decline by a factor of 10 to 100 during the first few weeks after installation of new products. Important sources of VOC emissions include various finish materials such as floor covering products (carpets and resilient flooring) and the adhesives used to install them, wall coverings, paints, sealers, waxes, and polishes. Various sealants, fillers, gaskets, adhesives, caulks, and other "wet" or liquid products used in multitudinous building application are also important potential sources. New furnishings such as office workstation components, particularly the vertical, mid-height partitions, present a large potential source of VOC emissions.

Often newly completed HVAC systems do not function properly due to incomplete or inadequate system balancing; faulty components or installation; and, inappropriate initial operating procedures. Most of the problems are eventually corrected. However, poor ventilation system performance coupled with high when contaminant levels due to elevated emissions from building materials, finishes, and furnishings can result in extremely large contaminant exposures to occupants.

Also, HVAC designs or installations are often inadequate for actual loads and building use. Changes in the anticipated occupancy, or failure to adequately anticipate the nature of the eventual occupancy during design requires adjustments or modifications. If the changes are not accomplished in a timely fashion, HVAC system operation may fail to provide the necessary ventilation, air cleaning, filtration, and thermal control.

Renovation

Buildings undergoing construction of additions, renovation, refinishing, or refurnishing have some of the same problems as new buildings: new materials with large emissions of VOC. Occupants often are not adequately protected from construction dust and offgassed VOCs. Air recirculated from construction activity or newly-finished areas into occupied areas results in elevated airborne concentrations of solvents, particles, and other air contaminants.

In speculative buildings, different tenants' spaces may be in the same ventilation zone. If one such tenant moves in before the other, and tenant improvements are made for the second tenant, the first tenant can be exposed to elevated levels of airborne contaminants from construction. Very often these include odiferous and noxious substances. Sources include adhesives used for caulks and sealants used in ventilation system components, floor coverings, carpets and carpet pads, partitions, paints, and furnishings.

Existing Buildings

Existing buildings can create bad IAQ in several ways. Load changes, deterioration of equipment, inadequate or inappropriate maintenance, poor housekeeping, reduced air flow for energy conservation, and contamination from building exhaust or other sources are just a few of the ways existing buildings can contaminate indoor air.

Woods has theorized that building deteriorate incrementally over their lives. He claims that there is insufficient responsibility for the overall quality of the indoor environment as buildings age. He proposes to remedy this situation with "continous accountability" by design professionals as a way to address this problem. However, the situation that now exists does not necessarily provide for adequate responsibility or authority by design professionals to provide oversight that might decrease the continuous deterioration. (Woods, 1990)

An Excacerbating Factor

Plaintiffs in SBS or BRI lawsuits usually have experienced considerable disruption of their lives, either due to an illness or permanent health damage attributed to exposure in the building, or due to displacement from the job, or due to both. Their experience often results in making them angry and emotional about the case and the defense. Thus, they tend to pursue their claims vigorously, if not zealously.

WHY IAQ LAWSUITS ARE NOT GOING TO TRIAL

Most IAQ lawsuits are not going to trial; usually they are settled during or immediately after the discovery phase. The reasons for this may have more to do with attorneys' fees than IAQ concerns.

Plaintiff's attorneys' fees are often based on contingency -- they receive a percentage of the award if the suit is successful. If they succeed in getting a judgment at trial, the cost of the trial and any subsequent appeals substantially reduces the amounts available to them and their clients. They advise clients that they are not likely to receive any more money by going to trial because of the additional costs and that they run the risk of losing completely or receiving a lesser amount. They recommend settlements with some of "smaller" defendants because this is a practical way to finance the continuation of the case against "deep pockets" defendants. This is especially true if the plaintiffs' attorneys are working on a contingency fee basis.

When defendants are large regional or national corporations; the negative publicity of a lawsuit is a substantial incentive to settle. Also, one adverse judgment might stimulate other lawsuits from others waiting for a precedent. Design professionals are also named as defendants. The deductible on their professional liability insurance is often \$100,000 to \$200,000. In many instances, the insurance companies retain attorneys, and they are paid by the hour. They will frequently advise the insured to settle for an amount less than the deductible. It is still a large enough sum to be acceptable to many plaintiffs attorneys, so the settlement is made.

Precedents set in IAQ cases are rare because so few go to trial and even fewer are appealed; a decision on appeal is required for the establishment of a precedent. Therefore, both plaintiff and defense attorneys are anxious to reduce the risk and uncertainty of going to trial by agreeing to a mutually acceptable settlement. Note that the attorneys for all parties are compensated this way.

Unfortunately, a settlement precludes a resolution of the issues under dispute. No responsibility or liability is established. Furthermore, the case record is often sealed as part of the settlement agreement, inhibiting access to the record by those who would wish to learn from it. Substantial resources are invested in investigations, testing, and expert testimony. This information would be valuable for both the indoor air quality community as well as other litigants. However, settlements keep these valuable records out of circulation.

One unfortunate result is that a considerable amount of information about the contribution of IAQ to the problems and complaints is never released to the public, government agencies, or other investigators. Also, ambiguity persists about responsibility and liability regarding IAQ.

STANDARD ARGUMENT OF DEFENDANTS AND DEFENSE EXPERTS

The most frequent argument of designers and experts for the defense is that the design in question met applicable codes and standards. The argument is clearly inadequate. In most cases it will appear to the plaintiffs, the judge, and the jury that there was something wrong with the building. Plaintiff's attorneys and experts will provide evidence and testimony to the contrary. In fact, registration laws for professional engineers are established constitutionally to protect public health, safety, and welfare. Thus, design professionals including ventilation system designers might be held to a higher standard than mere conformance to code. According to Gardner writing in the August 1990 ASHRAE Journal, a ventilation engineer might be required to meet a standard of care that exceeds codes and adopted standards. In particular, the attention SBS and building ventilation problems have received (including but not limited to the ASHRAE Journal) might raise the proper expectations of the community. (Gardner, 1990)

Plaintiffs attorneys and experts often find that the original designs are not clearly described (no or little design documentation) and or faithfully executed. In some cases, they have been modified subsequent to the original design or construction. Documented validation that the newly-completed building in question ever actually met the designer's assumed performance specifications is rarely available.

Defense claims that it was difficult to know exactly how the building would be used when the design was completed. The original designers (architects and engineers) either are given general direction or make some standard assumptions (e.g., 7 office workers per 1000 square feet of floor area, no smoking permitted, no unusual contaminants sources, standard forty-hour-per-week occupancy, etc.). When the actual tenants are identified, the capacity of the basic system is rarely questioned. The tenant improvements are made, sometimes by other than the original design engineers, without evaluation of the HVAC system's ability to support them. The designers of tenant improvements rarely evaluate the indoor air impacts of the planned activities in the new space on other spaces or tenants. Documentation of the original design assumptions is often spotty if available at all.

Modifications to the building or in its operation and maintenance often occur at or after the time of the events which generate the lawsuits. Therefore it becomes impossible for experts

to make measurements that will demonstrate the building's compliance or non-compliance with codes and standards or any other criteria.

There are usually no explicit requirements in codes nor in lease agreements that the building be operated according to the design. Nor is there usually any evidence that it was, in fact, operated accordingly.

ASHRAE Standards

Many defendants claim their designs meet ASHRAE Standards, 55 and 62. We have seen no evidence that this claim is justified by the available evidence. In fact, it is not clear that very many buildings designed and built to date have actually met the requirements of Standard 62-1981. Section 6.1.1, "Acceptable Outdoor Air" of Standard 62-1981 requires that the outside air used to meet the minimum specified outdoor air ventilation rates meet the National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency. (ASHRAE, 1981) And we will be surprised to see a building that meets the same section of Standard 62-1989. (ASHRAE, 1989) Specifically, Section 6.1.1 in both the 1981 and the 1989 versions of Standard 62 requires that the outside air used for ventilation meet ambient air quality standards. Outside air in virtually every major U.S. urban areas almost always exceeds National Ambient Air Quality Standards (NAAQS) levels for ozone, carbon monoxide, or particulates on several occasions each year. (EPA/OAQPS, 1988) For example, office buildings usually have no provisions to monitor and remove ozone or to monitor carbon monoxide and reduce outside airflows during elevated CO episodes.

LEGAL ISSUES OF THE NEW VENTILATION STANDARD

The new ASHRAE Standard 62-1989, "Ventilation for Acceptable Indoor Air Quality," will complicate IAQ-related lawsuits. At least four important issues exist regarding responsibility and the standard: 1) the design documentation requirement, 2) ventilation effectiveness standards, 3) avoiding porous materials in HVAC systems, and 4) compliance with the Air Quality Procedure, Section 6.2.

Design Documentation Requirement

Standard 62-1989 requires design HVAC system design documentation. The intention is to provide building operators and future designers with the necessary information to understand the design assumptions and systems selected by the designers. Very little guidance exists regarding the requirements for design documentation. The new "Guideline on Commissioning HVAC Systems" (ASHRAE Guideline 1-1989) also requires documentation, but does not

explicitly detail what is expected. On the other hand, the commissioning guideline does specify procedures for verifying the actual performance of HVAC systems. However, if 62-1989 is not followed because it is not embodied in codes, the commissioning guideline has even less force to assure its implementation.

At ASHRAE's 1989 Winter Meeting, members of the committee drafting the HVAC system commissioning guideline provided a reasonable list of documentation requirements, but these are not met in current practice. These include complete descriptions of the design criteria, HVAC components and systems, and operating protocols under each possible mode. Substantial changes in current engineering practice will be required if responsible documentation is actually prepared.

Besides new responsibilities emanating from the documentation requirements, other changes in professional practice will be required. The documentation requirement will require that communications between owner, architect, ventilation system engineer, and tenant-improvement designers be formalized. The ability of a system to meet codes, standards, guidelines, and contract (design, construction, or lease) provisions will be testable against written standards. These changes in practice will produce more responsible professional work, but disputes will arise about responsibility, fees, and liability. These changes will come neither quickly nor easily.

The requirement is ambiguous concerning who will be responsible for the documentation when the building is completed. If the building owner holds the documentation, new responsibilities may arise when tenancy changes. If a new tenant moves in and there is inadequate design capacity, the owner may be responsible for not sufficiently informing tenants of the inadequacy or correcting the HVAC.

Ventilation Effectiveness

Disputes will arise over ventilation effectiveness, one, its measurement methods, and two, responsibility or liability when completed systems fail to deliver outside air supply to the breathing zone as required by contract, code, or the ASHRAE standard. ASHRAE Standard 62 committee members have publicly expressed differing viewpoints regarding the standard's requirements for outside air delivery to the breathing zone. Therefore, individuals called as experts are likely to give conflicting testimony about the requirement's meaning. Such conflicting testimony will have a harmful impact on public and professional acceptance of the standard and on resolution of lawsuits.

Avoidance of Porous Materials

Prevalent, almost universal design practice is to use acoustic lining and sound attenuators to reduce fan noise transmitted to the occupied spaces through the ductwork. The standard implies that such lining should not be man-made mineral fiber which can provide a substrate for microbial contamination. Yet alternative sound control is not standard, and design professionals are hesitant to deviate from the usual practice and that of their peers. Such deviation increases potential liability in the case of law suits.

Compliance with the Air Quality Procedure

If a building is designed and operated to reduce outdoor air quantities under the provisions of Section 6.1 in the new standard because outdoor air quality is sub-standard, the recirculated indoor air will need to meet the Air Quality Procedure, Section 6.2.

We know of no buildings which have used the air quality procedure in Standard 62-1981, and we know of no buildings being designed under the procedure. The products and equipment manufacturers and ventilation engineers are not eager to use the air quality procedure. Among other things, inadequate guidance exists in the standard itself or elsewhere for the air quality procedure. Therefore, anyone bold enough to use the standard will have to break new ground, an inherently risky act if a lawsuit occurs.

Design professionals and product manufacturers will protect themselves against possible liability by following "state of the art" or current local professional "standards of care." Such arguments are difficult to support when innovative design approaches are used. Therefore, compliance with certain critical air quality provisions of the new standard is inherently risky. Cautious practice catches the design professional between the consensus standards of ASHRAE and the common practice of colleagues and peers. Plaintiffs and their attorneys have little patience with such considerations.

CONCLUSION

Indoor air quality complaints and occupant illness appear to be increasingly frequent. It is logical to expect that lawsuits will also increase. Design professionals must learn to use the guidance provided by ASHRAE and others to create comfortable, healthy buildings, or face the economic and professional consequences of litigation. ASHRAE needs to focus attention on developing sufficient practical assistance in interpretation and implementation of its standards to provide design professionals with a solid and complete basis for addressing indoor air quality concerns.

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SEMINAR ON LEGAL ISSUES IN IAQ

ASHRAE Winter Meeting

Atlanta, Georgia

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Hal Levin, ASHRAE Member

Hal Levin & Associates

Santa Cruz, California

- * Three Situations that Engender Lawsuits**
- * Why IAQ Lawsuits are Not Going to Trial**
- * Standard Arguments of Defendants and Defense Experts**
- * Legal Issues of the New Ventilation Standard**

Three Situations that Engender Lawsuits

SBS and BRI Lawsuits arise from three types of situations:

New buildings

Buildings undergoing construction or remodeling,

Existing buildings.

New buildings

1. New buildings offgas VOC, levels are often elevated

2. HVAC systems don't work correctly
 - a. incomplete or inadequate system balancing,

 - b. faulty components or installation, and

 - c. inappropriate operating procedures.

 - d. HVAC designs inadequate for loads and building use.

Buildings undergoing construction or remodeling,

Same problem as new buildings: new materials offgas VOC.

Occupants not protected from construction emissions.

Supply air recirculated

Existing buildings.

Existing buildings create bad IAQ

Load changes

Deterioration of equipment

Inadequate or inappropriate maintenance

Poor housekeeping

Reduced air flow for energy conservation

Contamination from building exhaust or other sources

And a Modifier

Plaintiffs usually have experienced considerable disruption of their lives, either due to an illness or permanent health damage attributed to exposure in the building, or due to displacement from the job, or due to both. Their experience often results in making them angry and emotional about the case and the defense.