INDOOR AIR QUALITY:
IS IT AN ISSUE FOR ARCHITECTS?

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Scott H. Phillips
Semmes, Bowen & Semmes
250 West Pratt Street
Baltimore, Maryland 21201
(410) 576-4717
sphillips@mail.semmes.com

J. Snowden Stanley, Jr.
Semmes, Bowen & Semmes
250 West Pratt Street
Baltimore, Maryland 21201
(410) 576-4811
jstanley@mail.semmes.com

I. INTRODUCTION

For many years most Americans have had some level of awareness through legislative and political debates and sometimes intense media attention that outdoor air pollution can cause danger to their health.

However, recent studies of human exposure to air pollutants sponsored by the U.S. Environmental Protection Agency (EPA) have indicated that *indoor* levels of many pollutants may be 25 times, and occasionally 100 times, higher than that of outdoor levels. The first wave of publicity regarding indoor air pollution arose out of occupational/industrial exposures to single source contaminants, such as asbestos. However, within the last ten years, new and more far reaching types of indoor air pollution incidents involving a wide variety of chemicals, some of them in common use in offices or homes, such as molds or other biologic agents which may grow on wet or damaged materials in buildings. These incidents have not been confined to industrial settings and have been blamed for a wide variety of symptoms in new and remodeled office buildings, single family residences, condominium developments, hospitals and public facilities such as courthouses and schools. Some of the affected public buildings have attracted considerable media attention due to their high profile including the headquarters of the Environmental Protection Agency in Washington, D.C. and the Investment Building in Towson which, until recently, had housed a large contingent of

county office workers.

These indoor air pollution incidents, sometimes called Asick building@ cases, have been estimated to as much as $1 billion in medical costs and $10 billion to $15 billion of lost worker productivity each year.[1] According to the World Health Organization, nearly 30% of all new and remodeled buildings worldwide may be afflicted with indoor air quality problems that may cause various health effects for the buildings= occupants, flamboyant stories in the media and popular press and litigation for the nations= courtrooms.[2] This heightened public awareness has resulted in a rapidly increasing number of building occupants demanding compensation for their illnesses. Tenants have sued building owners, architects, engineers, and anyone else involved in the construction of the building. Building owners in turn have made claims against anyone involved in the design or construction of the facility, including architects. As indoor air pollution receives more publicity, and as the government continues to emphasize the seriousness of indoor air pollution, more and more building occupants can be expected to assert claims against those they perceive to be responsible for their Asick building@ injuries.

While the architectural profession has not yet been a visible, major focus of publicity or litigation arising out of indoor air quality problems, the potential scope and cost of some of the incidents have led to everyone associated with a project being blamed when the air inside a building appears to be making residents, tenants, patients or customers sick. The resulting loss of reputation, money and time is likely to remain a serious issue for the profession for some years to come.

The purpose of this paper is to describe the nature and scope of indoor air quality issues facing architects in sick building cases. While no ironclad device is likely to

emerge to suit every project, this paper will also suggest some strategies architects might use to reduce their potential exposure to claims arising from such cases.

II. TYPES OF INJURIES ATTRIBUTED TO POOR INDOOR AIR QUALITY

As the issues associated with poor indoor air quality have come under increasing scrutiny from the medical, scientific and legal communities, various terms have been applied to varied symptoms and circumstances created by such buildings. These have included Asick building syndrome@, Abuilding related illness@ and Amultiple chemical sensitivity.@

As these terms are often used loosely, some discussion of commonly accepted definitions might be helpful.

A. Sick Building Syndrome

The World Health Organization (AWHO@) defines ASick Building Syndrome@ as Aan excess of work related irritations of the skin and mucous membranes and other symptoms including headache, fatigue, and difficulty concentrating, reported by workers in office buildings.@ The WHO further described the symptoms to include the following: (1) irritation of the eyes, nose, and throat; (2) dry mucous membranes and skin; (3) erythema (dermatitis erythematosa, redness of the skin, inflammation); (4) mental fatigue and headache; (5) respiratory infections and cough; (6) hoarseness of voice and wheezing; (7) hypersensitivity reactions; (8) nausea and dizziness.[3] Obviously, the Asymptoms@ of SBS are extremely broad and nonspecific, and it seems they could all arise from any number of ailments completely unrelated to indoor air quality. In light of these types of complaints, technical commentators have searched for a definition of Sick Building

Syndrome:

> According to industry IAQ [Indoor Air Quality] standards, sick building syndrome is diagnosed if significantly more than 20% of a building=s occupants complain of such symptoms as headaches, eye irritation, fatigue and dizziness for more than two weeks, if the symptoms are relieved when the complainant leaves the building, and if no specific cause of the problem can be identified.[4]

The EPA=s definition of the condition is nearly identical.[5] In light of the vague, nonspecific, and broad nature of the symptoms of those who allege they suffer from such Asick building syndrome@ or unrelated ailments many defendants understandably argue that these injuries are not serious or verifiable, and that they can be caused by a myriad of factors other than indoor air quality. Some courts have focused on the vagueness of these symptoms and have denied recovery *See, e.g., Sanderson v. International Flavors & Fragrances*, 950 F.Supp. 981, 984-93 (C.D. Cal. 1996) (Symptoms without injury and without proof that they were caused by substances for which defendant was responsible were not sufficient to support a claim), but this cannot yet be said to represent a general trend.

B. AMultiple Chemical Sensitivity@ (MCS)

AMultiple Chemical Sensitivity@ (MCS) is a developing phenomenon that is currently being debated in the medical and scientific communities.

There is much dispute as to whether MCS actually exists, and there is no consensus even as to the definition of MCS. The criteria proposed by the Agency for Toxic Substances and Disease Registry include: (1) a change in health status; (2) a defined set of symptoms triggered by multiple stimuli and reported for at least six months

in three or more organ systems; and (3) the exclusion of other medical conditions.[6] Criteria proposed by occupational physicians, clinical ecologists, internists, and otolaryngologists include: (1) chronic symptoms that are reproducible with low-level exposure; (2) symptoms that arise in response to multiple substances; and (3) symptoms that improve with avoidance.[7] These proposed criteria for the definition of MCS demonstrate that MCS does not represent any concrete diagnosis, disease, or illness as defined by orthodox medical practitioners. It must also be noted that the proposed definitions of MCS do not require the specificity of complaints necessary to qualify MCS as an objectively verifiable medical syndrome.[8]

While there is a great deal of controversy regarding MCS, certain factors are generally accepted. There are generally two groups of people who claim to suffer from MCS: (1) those who may become ill from a chronic low level exposure or exposures; and (2) those who are exposed to a very high level of a particular toxin or group of toxins for a relatively short period of time.[9] The primary suspected agents creating this condition are pesticides, solvents, resins, formaldehyde, and isocyanates.[10] A person with MCS, whatever it may be, becomes Aultra sensitive to very low levels of numerous toxic and even non-toxic substances.@[11] Those who suffer from this purported condition claim that items considered harmless by most people, such as scented deodorant soap, cause them to have violent physical reactions.[12] The diagnosis of MCS, sponsored by practitioners called "clinical ecologists", is not yet accepted by mainstream medicine. *See, e.g.*, American College of Occupational and Environmental Medicine, 1991 Statement ("[t]he pathophysiological mechanisms described by these practitioners do not in general conform to what is currently known of human biological functions" and MCS "is

presently an unproven hypothesis and current treatment methods represent an experimental methodology"); Council of Scientific Affairs, American Medical Association, 1992 Statement. (MCS "should not be considered a recognized clinical syndrome"). However, the Social Security Administration has recognized MCS as a valid and real condition. In some cases, the Social Security Administration has stipulated that the Social Security Administration recognizes multiple chemical sensitivity to be a "medically determinable impairment."[13]

C. ABuilding Related Illness@ (BRI)

A Abuilding related illness@ is characterized by a clinically diagnosable illness.[14] These conditions are relatively well documented and have defined diagnostic criteria, recognizable causes, defined treatments.[15] Usually, the removal of the identifiable source corrects the problem and prevents any further building related illnesses.[16] A prime example of a building related illness is Legionnaire=s Disease, caused by biological contaminants within a building=s air handling system or water system. Microorganisms present in building water systems, including cooling towers, potable water systems, decorative fountains and humidifiers, can result in serious building related illnesses.[17]

D. Injuries Caused By Molds

Some of the most serious injuries are caused by various toxic molds that can exist in buildings with water intrusion problems. Fungi commonly found in buildings with chronic water intrusion problems include *Stachybotrys, Aspergillus, Penicillium,* and *Trichoderma*.[18] Several mold species, including *Aspergillus, Fusarium, Penicillium*, and *Stachybotrys*, can produce a wide variety of non-volatile chemicals, commonly referred to as mycotoxins.[19] The potency and danger of mycotoxins is illustrated by the widespread

belief that the Soviet Union used mycotoxins from *Stachybotrys* as a biological weapon against Afghanistan.[20]

Even in low concentrations, these molds can cause adverse health effects, including skin irritation, respiratory disease, cancer, and immune disorders.[21] *Aspergillus Flavus*, a common indoor fungus, produces aflatoxins, which are notorious for their carcinogenic capacity. *Stachybotrys* is probably the most well-known mycotoxin-producing molds. *Stachybotrys chartarum* (previously known as *atra*) produces five different trichothecenes, which are both dermotoxic and cytotoxic.[22] In one study, an extract of *Stachybotrys*-produced trichothecenes was given to some rats, and they died within 24 hours.[23] Mycotoxins can enter the body via inhalation or skin contact. Toxic molds cause a wide variety of symptoms, including fatigue, nausea, headaches, respiratory distress, and eye irritation.[24] People exposed to these molds can also develop Organic Toxic Dust Syndrome (OTDS), a very serious condition that causes fever, flu-like symptoms, and respiratory distress within hours of a single, heavy exposure to dust containing organic material, including fungi.[25] OTDS may be caused by a variety of bioaerosols, including *Aspergillus* and *Penicillium*.[26]

Accordingly, damages in a toxic mold case can be extensive, and plaintiffs could recover damages for pain and suffering, past, present, and future medical treatment, future medical monitoring, lost wages, and loss of earning capacity. Public awareness about the dangers of toxic molds is rapidly increasing, indicating that more lawsuits may be filed for injuries allegedly caused by these molds. This increased public awareness is illustrated by a recent series of ARex Morgan, M.D.@ comic strips, which focuses on people suffering from exposure to *Stachybotrys atra* due to water in the basement of their

building in which they have a studio and a workout facility.

III. CAN ARCHITECTS BE HELD LIABLE FOR ILLNESS OR DAMAGE CAUSED BY INDOOR AIR POLLUTION?

It seems likely that a significant analysis of problems associated with sick building syndrome or other symptoms caused by poor quality indoor air might lead to the conclusion that any responsibility for such issues should be borne by the mechanical engineer, general contractor or subcontractor responsible for the HVAC system and not by the architect.

While such a thought process may be well-founded in particular projects, depending upon the provisions of the governing contracts and the administration of them, there have been various instances in which architects have been successfully targeted in such building cases.

A. Architects have been the targets of claims for damages arising from Indoor Air Pollution.

For obvious reasons, the building owners have probably been the most frequently sued parties in such building litigation. However, plaintiffs have also begun to sue *everyone* associated with the construction of a building, including architects. Furthermore, while a given plaintiff may sue only the building owner, the builder owner may be able to assert a third-party claim against the architect, on the grounds that the indoor air contamination is due to the negligent design of the building or selection and approval of its HVAC and other systems.

Commentators have recognized that A[a] building=s design team is particularly vulnerable to suits resulting from sick building syndrome claims,@ and that A[t]he architect and HVAC engineers may find that they are being sued not only by building occupants,

but also by the building owners for improper design and specification of materials.@[27] Furthermore, in a few recent instances Courts have held architects liable for damages to building owners and occupants.

For example, in *County of DuPage v. Hellmuth, Obata & Kassabaum, Inc.*,[28] the county brought an indemnification action against several parties involved in the construction of the county courthouse following an incident involving dangerously poor air quality. Seven hundred employees working in the courthouse had to be evacuated after a widespread outbreak of sick building syndrome symptoms including respiratory problems, headaches, and eye irritation. The jury found the county itself to be responsible for the majority of the problems because of steps the county had taken to rectify indoor air quality complaints, such as altering the ventilation system and using noxious chemicals to clean office furniture. At the same time, the jury found both the architect and the contractor liable for damages due to the initially negligent design and construction of the building=s ventilation system. Thus, although the architect had to pay relatively minimal damages in this case, it could have potentially been liable for all of the damages if the county had not taken negligent actions that had exacerbated the problem.

In *Shadduck v. Douglas Emmett and Co.*, No. WEC 136229 (Cal., Los Angeles County Super. Ct., May 1989), the plaintiff alleged that her repeated development of upper respiratory infections, coughing, eye and throat irritation, and headaches were caused by negligent design and maintenance of the HVAC system in her home. The plaintiff sued the building owner, leasing agent, *architects*, contractors and maintenance personnel. The case later settled for an undisclosed amount.

In another case, a computer programmer filed suit claiming a series of

neuromuscular problems arising from his exposure to indoor air pollutants in his poorly ventilated work space. The distributor of the chemically laden products, the architects and engineers were named as defendants. This case also settled prior to trial. *Buckley v. Kruger-Benson-Zierner*, No. 143393 (Cal., Santa Barbara County Super. Ct. 1987).

In *Call v. Prudential Insurance Co.*, No. SWC 80813 (Cal., Los Angeles County Super. Ct., Oct. 1990), the plaintiffs claimed that the defendants were negligent in using building materials capable of emitting formaldehyde, a known toxin, failing to warn tenants the building was not yet suitable for occupancy, failing to provide adequate ventilation, and failing to prevent the occurrence of air borne chemicals causing polluted air. While the plaintiffs focused their attack primarily on the building owner, the judge in *Call* extended the chain of liability for the indoor air quality problems to **everyone who was involved in the HVAC system**.

B. Bases of Architects= Liability

The most common theory of liability asserted against architects in sick building cases is negligence, as discussed previously in the *County of DuPage* case. Building occupants can allege that the architect failed to exercise the appropriate standard of care in designing the ventilation system and in choosing the appropriate materials for the construction of the building. Furthermore, building **owners** can assert negligence claims against the architect to indemnify them for occupants= injuries, and also for the costs associated with removing and remedying the indoor air problems.

An architect might be able to argue that a building owner=s negligence claim for the costs of remedying indoor air problems is barred by the Aeconomic loss@ doctrine. Under the Aeconomic loss@ doctrine, a claim for purely monetary damages cannot be made

under a negligence theory; the plaintiff is limited to a breach of contract action. *See, e.g., U.S. Gypsum Co. v. Mayor and City Council of Baltimore*, 336 Md. 145, 647 A.2d 405 (1994); *Council of Co-Owners Atlantis Condominium, Inc. v. Whiting-Turner Contracting Co.*, 308 Md. 18, 517 A.2d 336 (1986). However, this defense against a building owner=s claim based upon the Aeconomic loss@ rule might fail in light of recent developments in the case law. Courts have recognized a Aproperty damage@ exception to the Aeconomic loss@ rule. *Northridge Co. v. W.R. Grace & Co.*, 471 N.W.2d 179 (Wis. 1991) (plaintiff=s negligence claim to recover costs associated with asbestos removal was not barred by the Aeconomic loss@ rule because plaintiffs specifically alleged Aphysical harm to property@); *See also City of Greenville v. W.R. Grace & Co.*, 827 F.2d 975 (4th Cir. 1987). Furthermore, courts may well reject an Aeconomic loss@ defense based on the fact that in sick building cases, the defective condition poses a risk of physical injury to persons within the building. *See, e.g., 80 South Eight Street Ltd. Partnership v. Carey-Canada, Inc*., 486 N.W.2d 393 (Minn. 1992) (while negligence claims for purely economic losses are normally barred, the Aeconomic loss@ rule does not apply to cases where the plaintiff alleges a risk of serious personal injury). Thus, the chance that an architect will be able to successfully defend a building owner=s claim based on the Aeconomic loss@ doctrine may be weakened if these decisions are followed elsewhere..

Under some circumstances, plaintiffs might also recover against architects through a breach of warranty theory. Some courts have held that an architect impliedly warrants the fitness of his or her designs or plans for their intended purpose. *See New Mexico ex re. Risk Management Div. v. Gathman Matotan Architects*, 653 P.2d 166 (N.M. Ct. App. 1982) (noting that courts in Alabama, Pennsylvania, Washington, and

South Carolina have also held that architects impliedly warrant the fitness of the designs and plans for their intended purpose). Under this theory of liability, an architect could be held liable for indoor air pollution damages if the plaintiff could prove that the architect failed to furnish the building with an adequate ventilation system.

Architects must also be aware of federal or state regulations regarding indoor air quality. The Occupational Health & Safety Administration (OSHA) has proposed AIndoor Air Quality Regulations@ aimed at protecting the approximately 70 million American employees who work in indoor environments.[29] OSHA estimates that 21 million of these 70 million employees are exposed to poor indoor air. The proposed compliance requirements are focused on an employer=s duty to provide its employees with a safe work environment. The proposed regulations require that employers must develop and implement indoor air quality compliance plans, and must assure proper functioning of building systems which affect indoor air quality. Employers who do not control their buildings= ventilation systems must demonstrate a good faith effort to comply with these regulations. Thus, while architects may not be held directly liable for deviations from these regulations, employers sued by injured occupants may seek indemnification from architects for these injuries. Clearly, architects and other parties associated with building design will bear an increased responsibility for indoor air quality if these regulations are promulgated. Employers would demand that these parties take responsibility for all problems associated with indoor air quality within their buildings.

The American Society of Heating, refrigeration and Air Conditioning Engineers (ASHRAE) has also issued guidelines regarding indoor air quality. The current ventilation guideline is ASHRAE 62-1999, AVentilation for Acceptable Indoor Air

Quality.@ Most states have enacted ventilation and mechanical systems standards by reference to the ASHRAE guidelines.[30] These guidelines set forth requirements for building ventilation as measured in the number of air changes required in an hour. The higher the potential pollution level in a space, the more air changes per hour ASHRAE standards mandate. The ASHRAE guidelines currently recommend 20 cubic feet per minute of outdoor air per office occupant. Parties involved in designing building systems must estimate the number of occupants who will utilize a building space. Of course, the number of actual occupants may exceed the estimates, and the ventilation systems may not work as intended. Thus, designers may need to consider proposing more flexible HVAC systems that can be adjusted for changes in the use or occupancy of building spaces.

Obviously, architects and other design professionals should make sure that a building=s ventilation system complies with all applicable guidelines and standards, especially the ASHRAE guidelines. However, even perfect compliance with these guidelines may not insulate the architect from liability. Some courts have held that conformance with customary or local standards is not always a bar to professional liability. *See, e.g., Favalora v. Aetna Casualty and Surety Co.,* 144 So.2d 544 (La. App. 1962).

It is also important to note that if architects are sued for Sick Building Syndrome, their liability insurers may refuse to defend or provide coverage for these claims. Many insurance policies specifically deny coverage for such damages resulting under the Aabsolute pollution exclusion,@ which most insurers include in comprehensive general liability policies covering property damage or personal injury.[31] Courts have also held

that no coverage exists for sick building and indoor pollution claims due to the Aabsolute pollution exclusion.@ *See, e.g., West American Insurance Co. v. Band & Desenberg*, 925 F.Supp. 758 (M.D. Fla. 1996).

IV. ILLUSTRATIVE CASES

In order to understand how design professionals can be held liable for indoor air pollution, it may be helpful to examine two specific cases.

The Polk County Courthouse was built in central Florida in 1987. Four years later, 80% of its inhabitants complained of sick building syndrome.[32] Several people were diagnosed with permanent, debilitating, and sometimes fatal lung inflammation. These complaints all stemmed from exposure to bioaerosol contaminants; mold, mildew, and bacteria. Consultants and remediation experts identified numerous causes of the indoor air quality problem in the Courthouse, many of which were allegedly related to poor design for flashing was not implemented with the cavity walls, allowing water to flow into the building. Improper tiles were specified for the roof, causing it to leak. The drains and gutters specified for the courthouse were undersized, causing water to run underneath the framed roof, bringing in microbes that flourish in hot, dark, and damp conditions. The HVAC system was oversized, so that the system only had to blow a small amount of chilled air to achieve the desired ambient temperature. Because dehumidification occurs during the chilling cycle, and the time spent chilling the air was so short, building dehumidification was grossly inadequate. In addition, the fiberglass insulation specified for lining the ducts and air handlers proved to be a good medium for microbe growth. Even after mechanical brushing and chemical disinfection, bioaerosol contaminants remained embedded in the fiberglass. All of these factors caused large

amounts of mold and mildew to proliferate in the building, causing the occupants to exhibit the troubling symptoms.

In 1994, the Department of Motor Vehicles in Boston moved its headquarters into a new high-rise building.[33] Within six months, more than half of the occupants exhibited health complaints typical of Sick Building Syndrome. An investigation revealed that the air handling system in the new building used the space between the structural ceiling and the suspended ceiling tiles as a plenum through which air was circulated, rather than employing standard metal ductwork to move the air. The ceiling tiles were made of perlite, cellulose, and other materials, bonded by an inexpensive, starch-based glue. As moist, warm air from outside mixed with the cold air re-circulated in this ceiling plenum, condensation occurred on the upper surface of the ceiling tiles, causing them to ferment and release butyric acid into the air. Accordingly, a poorly designed air handling system was found to be the cause of the problem. The air handling system, while initially inexpensive, proved to be very costly in the end.

V. STRATEGIES TO LIMIT ARCHITECTS= EXPOSURE TO LIABILITY

In view of the wide range of potential causes to indoor air quality problems in an office, residential or medical facility, no device conferring complete protection upon an architect who wishes to design buildings in a competitive environment has yet been discovered. However, these are some strategies which may limit a designer=s exposure to such claims.

A. Focus on the Issue.

While many architects may never have occasion to deal with indoor air quality complaints on any of their projects, all need to remain concerned about the issue

throughout the course of all commercial or residential projects.

Although the risk of these issues may seem greatest on commercial, medical or residential projects which will house large numbers of people, it needs to be pointed out that mold and other problems have caused serious health problems in single family dwellings as well.

B. Careful drafting of contract documents.

Since every project is different, no strategy can be considered foolproof. However, probably the best way to avoid or limit an architect=s liability for indoor air quality problems is through awareness of indoor air concerns involved in a particular project coupled with careful contract drafting, careful (or lucky) selection of sub-consultants and diligent contract administration.

While, in an ideal world (for an architect) it might be possible for an architect to disclaim liability for any claims arising from indoor air quality issues, such attempts would be unlikely to ever be acceptable to an architect=s client.[34]

Consequently, it would seem that a likely first line of defense might most often be careful drafting of contract documents, including the HVAC specifications, based upon a realistic and careful appraisal of the indoor air quality needs of the building and all of its occupants. This may involve such extremely simple precautions as not locating air intakes near truck loading docks or helicopter landing pads or the more problematic challenge of assuring that the mechanical consultant designs for the HVAC systems are flexible enough to provide adequate fresh air supply to a building with movable internal partitions which may block or change air flow as the location and needs of occupants change.

Contract documents which permit a careful and rigorous selection of mechanical subcontractors who understand these issues and have the capacity to properly install HVAC equipment adequate to the needs of a structure and its occupants obviously represent another important line of defense and service to clients.

C. Contract Administration.

The value of carefully drafted contract documents will deteriorate drastically if an architect does not pay close attention to them and enforce their provisions.

Particularly, if an architect has any construction phase responsibilities, it is essential to make certain that the HVAC systems which are the first line of defense against sick building problems are properly installed and that no changes take place which might degrade the suitability of the system for the particular project.

D. Communication with Owner/Client.

There will surely be instances in which an owner or a contractor will seek to Avalue engineer@ or otherwise reduce the cost of a project to keep it within a budget. Components of high quality HVAC systems may be vulnerable to focus as part of such a cost-reduction effort.

In the event that such efforts may degrade the buildings= capacity to provide necessary air quality to building occupants, an alert architect and his or her subconsultants will need to consider whether the alterations are of such scope and importance as to require written notice of his concerns to the owner or client.

E. OEM Manuals and Commissioning Process.

One issue which must always be considered in evaluating responsibility for indoor air quality problems in any building is whether the building, and its HVAC system,

insulation and drains have been properly operated and maintained. This is especially true with regard to structures which have been in use for some years prior to the problem arising.

For this reason, it will be important for a designer to be able to prove that complete OEM Manuals and other materials necessary to understand the requirement for proper operation and maintenance of all relevant systems were provided. Additionally, especially on a building with a high concentration of occupants and complex systems documentation of a complete and thorough commissioning process can be of the greatest assistance in evaluating responsibility for indoor air pollution issues.

F. Prompt Response to Complaints.

For many years, it was not unusual to hear commercial building owners and construction industry personnel reject complaints about Asick buildings@ as unfounded complaints of unhappy workers (or worse).

Architects and others in the building and construction industry can no longer afford that attitude. Consequently, a prompt response to any serious complaint that workers, residents or patients are being sickened with an investigation by competent experts is essential. Not all Asick building@ situations result in an explosion of embarrassing publicity and litigation but prompt reaction by all involved might have avoided or limited the severity of some of the unfortunate incidents mentioned above.

VI. CONCLUSION

Indoor air quality problems seem likely to assume increasing importance for architects and all others involved with the construction process. There is no longer any legitimate doubt that the issue is real.

Although avoiding exposure to such claims may be a challenging task, particularly for architects designing facilities housing large numbers of employees, residents or patients, there are strategies which can serve to limit such exposure or at least permit it to be identified as early as possible.

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