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Energy & Environmental Strategies for the 1990's

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PREFACE — CONFERENCE SPONSOR'S STATEMENT

This year the 13th World Energy Engineering Congress has been joined by the World Environmental Engineering Congress. All papers presented are included in this one comprehensive work, reflecting the accomplishments of hundreds of energy engineers and managers who have contributed as speakers, chairmen, and reviewers. We congratulate our sponsors—the U.S. Department of Energy (Office of Institutional Programs), Gas Research Institute, Alliance to Save Energy, and Georgia Office of Energy Resources—for supporting this program and playing a major role in fostering technology transfer.

We also congratulate the Association of Energy Engineers and its 7,500 members for providing the leadership for the industry to develop.

For thirteen years, the World Energy Engineering Congress has provided the essential forum for industry. The sharing of information is important to the continued growth of the energy engineering profession. AEE is proud to play a major role in sponsoring this vital conference.

Albert Thumann, P.E., CEM
Executive Director
Association of Energy Engineers

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INTRODUCTION

Energy & Environmental issues will dominate the industry in the 1990's and create new opportunities.

Eleven hundred members of the Association of Energy Engineers who responded to a recent survey indicated that an alarming 56% feel energy security (ample supply of oil, gas and electricity) has become worse over the last five years. The issues having highest impact on their organizations' business over the next five years are increased environmental regulations (70.2%), prices of oil, gas and electricity (67.8%) and reduced reliability of electricity (49.4%).

There is no question that energy management will play an increasingly important role in a company's strategic plan. Approximately 47% of those surveyed felt their energy management program was better this year as compared to a year ago.

This comprehensive up-to-the-minute reference includes the latest methodologies used to improve efficiency and lower operating costs plus new factors such as indoor air quality, CFC reduction and emission control technologies which must be addressed to stay competitive in the 1990's.

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SECTION 1
ENERGY AND THE ENVIRONMENT

Chapter 1

LEGAL IMPLICATIONS OF INDOOR AIR POLLUTION

W.H. Kitchens

I. Introduction

In the past two decades, environmental regulation has become pervasive in our society.[1] The American public is clearly more conscious of the potential hazards associated with the release of contaminants in the air, water and land. Increasingly industrial and commercial businesses, and even individual landowners, are paying for costly clean-up actions necessitated because of past use and disposal of toxic or hazardous substances. Indeed, several commentators have opined that the 1990's will be the environmental decade.

Consequently, we can anticipate a proliferation of environmental legislation and regulations and additional legal enforcement of those environmental laws in the courts. Although Americans spend up to ninety percent of their days indoors, resulting in a significant potential for exposure to contamination in the air indoors,[2] only recently has public concern over environmental issues begun to focus on problems associated with indoor air pollution.[3]

II. Indoor Air Pollution Issues

A recent report from the United States Environmental Protection Agency concluded that:

> [P]ersonal and indoor exposures to toxic and carcinogenic chemicals are nearly always greater -- than outdoor concentrations. We are led to the conclusion that indoor air in the home and at work far outweighs outdoor air as a root of exposure to these chemicals.[4]

Pollutants in indoor air include a wide range of substances including radon,[5] asbestos,[6] volatile organic chemicals,[7] combustion by-products,[8] environmental tobacco smoke,[9] and biological contaminants.[10] These indoor air pollutants may pose serious threats to public health, including increased risk of cancer, respiratory illness, multiple chemical sensitivities, skin and eye irritation, and related effects.[11]

The attention given to indoor air pollution is increasingly being directed to what is referred to as "sick building syndrome (SBS)." Rising energy prices in the 1970's prompted energy conservation measures in commercial buildings and residences. Buildings were designed with or modified to have heavy insulation and permanently closed windows. Additionally, ventilation rates of outside air within buildings were reduced and consequently, airborne pollutants were trapped inside. SBS results from inadequate fresh air ventilation combined with pollutants emitted from building materials, furnishings, or other products used inside the building, as well as from biological contamination, and/or contamination from outside the building which is drawn inside. In short, SBS is created by a combination of defects in a building's design, construction, ventilation, and maintenance that results in harmful levels of pollutants. It has been stated that as many as twenty percent of office workers may be exposed to environmental conditions manifested as "sick building syndrome."[12] Health complaints that stem from SBS range from headaches, nausea, eye irritations, and respiratory difficulties to more serious health problems, such as motor-function disorders.

III. Legal Developments

The discovery of hazardous or toxic substances improperly disposed of decades earlier can be financially devastating to the owner and operator of a facility at that location. Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), also know as Superfund, liability for site remedial costs can extend to present and past owners or operators of the site, parties who transported waste to the site, and parties who arranged for waste to be disposed or treated there. Similarly, the presence of indoor air pollution in a commercial building can have serious economic impact not only for the owner, but also for persons who are directly or indirectly associated with the building's air pollution problems, such as contractors, architects, engineers, tenants, real estate brokers, lenders, and manufacturers of building products and chemical products used in the building.

To date, most legal developments in the area of indoor air pollution have come through the application of common law concepts[13] applied in personal injury and contract cases. Legal actions brought concerning indoor air pollution have been based on allegations of intentional or negligent misrepresentation or nondisclosure of defects in property, breach of contract or warranty, nuisance, fraud, and strict liability. For example, there have been a substantial number of cases brought by persons alleging injury from urea formaldehyde foam insulation in buildings and mobile homes. Additionally, there have been significant personal injury claims made because of the presence of asbestos in factories, commercial buildings, and in homes. More recently, other types of cases are being filed by persons alleging injuries associated with sick-building syndrome.

Legal exposure in this area is not limited to claims of personal injury. For example, in Roberts

v. Estate of Barbagallo,[14] a purchaser of a duplex sought recision of the sale and other damages after urea formaldehyde foam insulation was found in the walls of a purchased residence. The court concluded that the presence of urea formaldehyde foam insulation was information material to the real estate sale and held that the real estate agent for the seller was liable for fraudulent concealment. The court further determined that the seller was liable for its agent's fraudulent concealment and ruled that the purchaser was entitled to recision of the deed of sale and reimbursement of all cash expenditures required to purchase the property. Similarly, school districts, state and municipal governments, owners of commercial buildings, and tenants in those buildings, have filed a wave of property damage claims to determine who must bear the responsibility for abatement of asbestos or payment for the increased costs of constructing improvements in buildings where asbestos is present. For example, in Sun Insurance Services, Inc. v. 260 Peachtree Street , Inc., the Georgia Court of Appeals interpreted a lease agreement to require the owner of the building to bear the cost of asbestos removal made necessary by the planned renovations of the tenant.[15] Likewise, existing environmental statutes are also being used to require mitigation of indoor air pollution. In two recent cases, federal courts have extended the application of CERCLA (Superfund) to recover costs incurred in cleaning up sources of indoor air contamination.[16]

Given this increased amount of litigation, we can expect the problems associated with SBS and other forms of indoor air pollution to receive increasing attention in this decade. More and more employees in commercial buildings will make the connection between health problems and their office environment; consequently, there will be an increasing possibility that these individuals will take legal action to recover damages for exposure to contaminants that affect their health. Likewise, building owners and tenants, whose economic interests are in jeopardy because of these problems, can be expected to seek reimbursement costs for clean-up, mitigation, and containment of contaminated indoor air. These actions will be directed against sellers, landlords, persons connected with the design and maintenance of the building and those who supplied building materials and other chemical products contributing to the indoor air pollution problem. In certain circumstances, these cases may seek not only remediation costs, but also damages for diminution in the value of the property or the inability to lease or sell the property. Under certain circumstances, buyers of contaminated property may seek recision of the sale. Likewise, brokers involved in the sale or lease of contaminated property may be sued for concealing an indoor air hazard or for failing to investigate a potential problem. Moreover, lenders involved in the real estate transaction may inherit an indoor air pollution problem due to abandonment of the building or default by the building owner.

IV. Efforts to Address the Problem of Indoor Air Pollution

As a result of this potential legal exposure, it is essential that building owners, tenants, architects, engineers, brokers, lenders, and suppliers of commercial and consumer products used in buildings, understand the problems associated with indoor air pollution and obtain guidance in this area. Indoor air pollution problems ideally should be dealt with before they erupt into litigation; and therefore, preventive measures should be strongly advocated. To deal effectively with the problem, there must be a better understanding of the technical issues presented by indoor air pollution. Additionally, development of generic strategies and standards relating to proper building design, operation, and maintenance must be encouraged to prevent and remedy indoor air pollution problems.

There has been an inadequate effort to date by federal and state agencies to conduct research on the seriousness and extent of indoor air contamination and to identify its health effects. Although the United States Occupational Safety and Health Administration[17] has established standards governing some environmental contaminants in the workplace, its primary focus in this area has been on establishing standards for toxic substances known to exist in certain industries, occupations, or work environments. With regard to the overall quality of indoor air, governmental agencies have been slow to consider control technologies, education programs, and other methods of reducing human exposure to contaminants.[18] This could change dramatically in the near future.

Congress is currently considering legislation that would give broader powers to the United States Environmental Protection Agency in the regulation of indoor air quality. The proposed Indoor Air Quality Act (S.657) is sponsored by Senator George Mitchell (D., ME); a companion bill (H.R. 1530) in the House of Representatives is sponsored by Representative Joseph Kennedy (D., MA). The proposed legislation provides for the development and implementation of a program to respond to and reduce indoor air contamination. It requires an expansion of research on the extent and sources of indoor air pollution and the human health effects of indoor air contaminants. Another objective of the legislation is to promote assessments of technologies and management practices for the control and measurement of contaminants in the air indoors, including analysis of the adequacy of existing ventilation standards and guidelines.

The proposed bill also provides for the development of indoor air contaminant health advisories that would identify contaminants known to occur in indoor air at levels that may reasonably be expected to have an adverse impact on human health. Another section of the legislation establishes a Federal Building Response Plan to address and reduce indoor contamination in federal buildings and to establish methods of reducing indoor air contamination in new federal buildings. Development of a Federal Building Response Plan would clearly serve as a "model" for the development and implementation of general building design principles to avoid or prevent contamination of indoor air.[19] Finally, it should be noted that the proposed legislation provides no new enforcement authority to regulate indoor air beyond that in existing environmental statutes and regulations.

V. Future Directions Addressing The Problem

Given the increasing legislative and public attention to indoor air pollution, certain trends can be anticipated. First, it seems clear that there will be increasing attention given to measures that can be implemented to reduce exposure to indoor air contaminants. These actions will include general building management practices, product purchase guidelines, and training programs