

Appendix I: Estimates of Significant Risk re: IAQ

A number of respondents to the OSHA RFI provided comments regarding the existence of a significant risk from poor indoor air quality.

The Business Council on Indoor Air cites three references in support of their estimate that approximately 20-30 percent of office workers experience symptoms attributable to poor IAQ. (3-933; Q2c, p. 26)

The Service Employees International Union (AFL-CIO) (SEIU) reports that "on average, 50-70 percent of workers throughout the completed SEIU's indoor air pollution survey have experienced health symptoms associated with 'sick building syndrome.'" (3-630; Q2c, p. 6)

Theodor D. Sterling & Associates (TDSA) "suggests a base line of complaint of up to 20 percent in any building." TDSA cites three studies to substantiate this estimate. (3-1073; Q2c, p. 1) TDSA also reviews 12 additional studies which support this contention.

Earon Davis, an environmental health consultant from Illinois, states that "my estimate is that upwards to 30 percent

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of the work force suffers adverse health effects due to poor indoor air quality." (3-966; Q2c, pp. 1-2)

The National Energy Management Institute (NEMI) reports that "indoor air quality is a serious and widespread health threat in the significant percentage of both industrial and non-industrial workplaces in the United States." (3-1183; p. 3) The comment states:

Reports (WHO, Honeywell, and others) describe that up to 30 percent of buildings may be 'sick.' Our experience suggests that the number is likely to be somewhat lower overall--probably 10-20 percent. However, we would estimate that perhaps more than 50 percent of the workplaces in the United States include some areas which have air quality so poor that it can cause adverse short-term health effects and/or reduced productivity. (3-1183; p. 8)

U.S. West reports that:

In contrast, our experience has been reasonably consistent with the widely cited statistic that, at any given time, up to 20 percent of the occupants of any office may report dissatisfaction with the IAQ. (3-968; Q2c, p. 2)

The AFL-CIO reports that "indoor air pollution is a widespread problem that is estimated to affect 30-70 million building occupants, many of whom are workers. Between 800,000 and

1,200,000 commercial buildings in the United States are estimated to have indoor air pollution problems." (L3-1185; p. 1)

United Technologies states that "it is very common to find that more than 20 percent of employees interviewed during consultations, inspections, and complaints complain of an IAQ problem." (3-651; Q2c, p. 2)

Eagle Environmental Health, citing three studies, reports that:

The number of reported tight building syndrome outbreaks/health-related complaints due to poor IAQ has risen dramatically in recent years. As much as 13% of all reports to the National Institute for Occupational Safety and Health (NIOSH) concern IAQ problems. (3-500; p. 3-1)

Interface Research Corporation cites the World Health Organization estimate that approximately 30% of commercial buildings may be designated as "sick." (3-1152; Q2c, p. 2)

The AFL-CIO estimates that indoor air pollution may affect 30-70 million building occupants, and that between 800,000 and 1,200,000 commercial buildings in the United States have indoor air pollution problems. (L3-1185; p. 1) However, the AFL-CIO cites no references or data in support of their estimate.

Based on a study by Jamerson, Professor James Woods' submission estimates that as much as 20 to 30 percent of the building stock in the United States may be affected by sick building syndrome. This, he claims, may affect as many as 30,000,000 workers. (3-745; Attachment D)

The EPA reports that "in the opinion of some World Health Organization experts," up to 30% of new or remodeled office buildings in industrialized countries may have unusually high rates of health and comfort complaints from occupants due to poor indoor air quality. (3-1075; Attachment C, p. 27)

Based on their experiences in IAQ case studies and "review of numerous publications and investigations carried out by others," the National Energy Management Institute (NEMI) reports that:

Indoor air quality is a serious and widespread health threat in a significant percentage of both industrial and non-industrial workplaces in the United States. (3-1183; p. 3)

The potential magnitude of absenteeism and reduced worker productivity attributable to poor indoor air quality is discussed in a number of submissions.

ENV Services, Inc., states that:

Decreased productivity is difficult to measure, but it certainly does occur with affected individuals. Sufferers of poor IAQ complain of fatigue, lack of attentiveness, sleepiness, and an inability to do more than the minimum required to retain their jobs (e.g., many complain they no longer take work home, attend professional meetings, optional business meetings, etc., because they are not physically able). We have this information from client interviews. (3-1089; Q2d, p. 4)

Philip Morris cites four studies and states that:

A number of estimates and examples of lost work time and decreased productivity attributable to poor indoor air quality are found in the published literature. For example, Professor James Woods has estimated that a 25 percent energy savings in building operations (e.g., reduced ventilation) may be out-weighed by the loss of anywhere from 2 to 6 minutes per person per day of productive concentration. (3-1074; Q2d, p. 1)

Earon Davis states that "I feel that there is a tremendous amount of lost time and decreased productivity stemming from poor indoor air quality. My off-the-top-of-the-head estimate is that some poor indoor air quality probably reduces our nation's overall productivity more than 10 percent." However, no data are cited. (3-966; Q2d, p. 2)

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TDSA reports from a review of ten studies that:

overall, data required to reasonably estimate firstly how much lost work time then decreased productivity is traceable to workplace related illnesses, and secondly to then determine what proportion of workplace related illnesses may be attributable to poor IAQ are not currently available. (3-1073; Q2d, p. 6)

Submitting a study by Jamerson, Professor James Woods provides calculations which suggest that the number of employees reportedly affected by poor IAQ translates into higher absentee rates and lower productivity and, therefore, increased costs to the employer. (3-745; Attachment D)

The American Federation of Government Employees (AFL-CIO) (AFGE) writes that "the majority of those surveyed indicated that they believe their ailments hamper their job performances; more than 47 percent said they have lost time from work because of their symptoms." [Based on AFGE study results.] (3-529; pp. 6-7)

Interface Research Corporation reports that "worker absenteeism and lower productivity are related to poor IAQ." (3-1152; Q2e, p. 2)

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The Labor Council for Latin American Advancement reports that "studies have shown that inadequate ventilation causes employee sickness and negatively affects productivity." (3-857; p. 1)

SEIU states that:

EPA estimates \$60 billion is lost in decreased productivity due to poor indoor air quality annually. However, estimates of work time lost due to indoor air pollution may be an effective way to measure the extent of the problem, because many workers cannot make the connection between their symptoms and discomfort and indoor air pollution. Workers will continue to work while experiencing discomfort, or will attribute the use of sick leave to other causes. Results of the Pennsylvania statewide indoor air quality survey conducted by SEIU Local 668 indicate that poor air quality can cost employers millions of dollars in lost work time and productivity. Respondents reported missing on average of 2.85 days per year due to poor air quality. With 10,000 local 668 members earning an average of \$110 per day, the state loses over \$3.1 million per year in lost work time due to indoor air quality problems for this group of workers alone. (3-630; Q2d, p. 7)

The State of Maine Department of Human Services reports that the effects of poor IAQ are "considerable; especially lost productivity. An estimate suggests . . . 80 percent or more based on personal experience." (L3-1175; Q2d, p. 1)

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The National Energy Management Institute reports that:

We have not performed any quantitative study of productivity losses resulting from poor IAQ. Still, our experience leads us to conclude that poor IAQ does cause considerable losses in work time and decreased productivity. After reviewing our case studies, we estimate that individual productivity losses, in terms of lost hours, may range from 1-10 percent, and were typically in the range of 1-5 percent. These findings re-enforce the results of the survey that NEMI participated in with the American Federation of Government Employees (AFGE) as part of the Safe Workplace Air Coalition (SWAC). (3-1183; Q2d, p. 8)

U.S. West reports that:

Many different adverse effects can be listed that may be attributable to the quality of indoor air. Adverse health effects include upper respiratory irritation, general malice, eye irritation, dyspnea, and other breathing difficulties and headache. Our own experience has been that these were often subjective symptoms. Other adverse effects include employee absenteeism. Other adverse effects include employee absenteeism, decreased productivity and employer costs associated with responding to IAQ complaints. (3-968; Q2b, p. 2)

Healthy Buildings International, Inc., (HBI) reports that "in 1985, Garibaldi and Dixon estimated that such respiratory tract infections account for approximately 150 million lost work days and \$15 billion of direct medical care costs annually in the U.S. alone." (3-1053; Q2e, p. 11)

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The Robens Institute of Health & Safety reports that:

Various estimates have been made of the cost of ill health caused by working in an unsuitable working environment. Woods (1989) has estimated the medical care costs in the U.S.A. 'excluding any contribution from exposure to environmental tobacco smoke' may exceed \$1 billion annually. In addition, he estimates visits to medical services due to indoor air quality concerns and office environment to cost \$500 million. If impaired efficiency at work is added, a further cost of \$10 billion may be involved. (3-507; p. 5)