

Architectural and Transportation Barriers Compliance Board (Access Board)

NIBS IEQ Final Report 7/14/05

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Introduction

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The Architectural and Transportation Barriers Compliance Board (Access Board) is an independent federal agency devoted to accessibility for people with disabilities. The Access Board is responsible for developing and maintaining accessibility guidelines to ensure that newly constructed and altered buildings and facilities covered by the Americans with Disabilities Act and the Architectural Barriers Act are accessible to and usable by people with disabilities. In November 1999, the Access Board issued a proposed rule to revise and update its accessibility guidelines. During the public comment period on the proposed rule, the Access Board received approximately 600 comments from individuals with multiple chemical sensitivities (MCS) and electromagnetic sensitivities (EMS). They reported that chemicals released from products and materials used in construction, renovation, and maintenance of buildings, electromagnetic fields, and inadequate ventilation are barriers that deny them access to most buildings. Americans spend about 90 percent of their time indoors, where concentrations of air pollutants are often much higher than those outside. According to the U.S. EPA Healthy Buildings, Healthy People: A Vision for the 21st Century, www.epa.gov/iaq/hbhp/hbhptoc.html "Known health effects of indoor pollutants include asthma; cancer; developmental defects and delays, including effects on vision, hearing, growth, intelligence, and learning; and effects on the cardiovascular system (heart and lungs). Pollutants found in the indoor environment may also contribute to other health effects, including those of the reproductive and immune systems." (p. 4). The report further notes that "Most chemicals in commercial use have not been tested for possible health effects. (p. 8). There are a significant number of people who are sensitive to chemicals and electromagnetic fields. Surveys conducted by the California and New Mexico Departments of Health and by medical researchers in North Carolina found 16 to 33 percent of the people interviewed reported that they are unusually sensitive to chemicals, and in the California and New Mexico health departments' surveys 2 percent to 6 percent reported that they have been diagnosed as having multiple chemical sensitivities. C. Miller and N. Ashford, "Multiple Chemical Intolerance and Indoor Air Quality," in *Indoor Air Quality Handbook Chapter 27.8* (McGraw-Hill 2001). Another California Department of Health Services survey has found that 3 percent of the people interviewed reported that they are unusually sensitive to electric appliances or power lines. P. LeVallois, et al., "Prevalence and Risk Factors of Self-Reported Hypersensitivity to Electromagnetic Fields in California," in California EMF Program, "An Evaluation of the Possible Risks From Electric and Magnetic Fields (EMFs From Power Lines, Internal Wiring, Electrical Occupations and Appliances, Draft 3 for Public Comment, April 2001" Appendix 3 (<http://www.dhs.ca.gov/ehib/emf/RiskEvaluation/riskeval.html>). Individuals

with multiple chemical sensitivities and electromagnetic sensitivities, who submitted written comments and/or attended the public information meetings on the draft final rule, requested that the Access Board include provisions in the final rule to make buildings and facilities accessible for them. The Board has not included such provisions in their rules, but they have taken the commentary very seriously and acted upon it. As stated in the Background for its Final Rule Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Recreation Facilities: <http://www.access-board.gov/recreation/final.htm>“The Board recognizes that multiple chemical sensitivities and electromagnetic sensitivities may be considered disabilities under the ADA if they so severely impair the neurological, respiratory or other functions of an individual that it substantially limits one or more of the

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individual's major life activities. The Board plans to closely examine the needs of this population, and undertake activities that address accessibility issues for these individuals. The Board plans to develop technical assistance materials on best practices for accommodating individuals with multiple chemical sensitivities and electromagnetic sensitivities. The Board also plans to sponsor a project on indoor environmental quality. In this project, the Board will bring together building owners, architects, building product manufacturers, model code and standard-setting organizations, individuals with multiple chemical sensitivities and electromagnetic sensitivities, and other individuals. This group will examine building design and construction issues that affect the indoor environment, and develop an action plan that can be used to reduce the level of chemicals and electromagnetic fields in the built environment.” This report and the recommendations included within are a direct outgrowth from that public comment process. The Access Board contracted with the National Institute of Building Sciences (NIBS) to establish this Indoor Environmental Quality Project as a first step in implementing that action plan. A broad and distinguished Steering Committee was established and met in January 2004 in Bethesda, Maryland, to review the project objectives. Subsequently four task teams (committees) were established to address specific issues in buildings related to Operations & Maintenance, Cleaner Air Rooms, Design and Construction, and Products and Materials. The following reports from these four committees offer recommendations for improving IEQ in buildings. They also list valuable resources and references to allow readers to investigate the pertinent issues in greater depth. The focus of the project was on commercial and public buildings, but many of the issues addressed and recommendations offered are applicable in residential settings. Many volunteers worked diligently to create the recommendations in this report. These individuals are listed in the separate committee sections of the report, but special thanks go to the committee chairs: respectively Hal Levin, Building Ecology Research Group; Michael Mankin, California Division of the State Architect; Roger Morse, Morse-Zentner Associates; and Brent Kynoch, Kynoch Environmental Management, Inc. Lastly, an enormous debt of gratitude is owed to four amazing individuals who made significant contributions to the work of all four committees: Mary Lamielle, National Center for Environmental Health Strategies;

Ann McCampbell, MD, Multiple Chemical Sensitivities Task Force of New Mexico; Susan Molloy, National Coalition for the Chemically Injured; and Toni Temple, Ohio Network for the Chemically Injured. The overall objectives of this project were to establish a collaborative process among a range of stakeholders to recommend practical, implementable actions to both improve access to buildings for people with MCS and EMS while at the same time raising the bar and improving indoor environmental quality to create healthier buildings for the entire population. This IEQ project supports and helps achieve the goals of the Healthy Buildings, Healthy People project, which acknowledges that "We will create indoor environments that are healthier for everyone by making indoor environments safer for the most vulnerable among us, especially children." (p.17) Summary Recommendations The recommendations in this report are only a first step toward the action plan envisioned by the Access Board.

INTRODUCTION AND OVERVIEW Problem Summary

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The operation and maintenance of commercial and public buildings can affect their accessibility for people with asthma and multiple chemical and/or electromagnetic sensitivities. The presence of many products or conditions involved in cleaning, maintaining, using, and operating buildings often contributes to poor indoor environmental quality and are access barriers for these individuals. Problematic substances include, but are not limited to, pesticides, fragrances, disinfectants, many cleaners and new building materials and furnishings, and smoke and other engine exhaust. Inadequate ventilation of a building further contributes to poor indoor environmental quality. The presence of electromagnetic fields from office equipment and other sources is a barrier for those with electromagnetic sensitivities. Noise and vibration can adversely affect some people with chemical and/or electromagnetic sensitivities and trigger seizures in susceptible individuals.

General Solutions:

Measures taken to improve indoor environmental quality, such as reducing air pollutants, noise and electromagnetic fields in buildings, will increase their accessibility for people with asthma and chemical and/or electromagnetic sensitivities, as well as provide a more healthful environment for all building occupants. While "green" and "environmentally-friendly" practices and products for construction and maintenance of buildings sometimes provide more healthful indoor environments and improves access for those with asthma and multiple chemical sensitivities, this is not always the case. The U.S. EPA notes that there is growing concern that standards being promoted by the green building movement, such as Green Seal and Green Guard standards, are not sufficiently protective of health (1). For example, some measures recommended to promote energy and water conservation -- such as reducing outdoor air supplied and/or reducing time of HVAC

usage, using motion sensors that can create electromagnetic fields, using waterless urinals that require continuous chemical treatments, recommending cold water for cleaning, and promoting the use of alcohol hand wipes instead of hand washing – can cause or lead to increased indoor pollution and less healthful and accessible environments. In addition, “greener cleaners” often promote the use of citrus- and/or pine-based products, which can react with even low levels of oxidants, such as ozone, to produce hazardous byproducts, as well as make buildings inaccessible for many people with chemical sensitivities. The addition of either synthetic or natural fragrances to cleaning and other products is also problematic for chemically sensitive individuals. Other common green building recommendations, such as building on brownfields, using tuck-under parking, and putting heliports or gardens on roofs can also lead to diminished indoor air quality and create barriers for people with chemical sensitivities. Lastly, the green building community has yet to provide guidance on the issue of electromagnetic fields.

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Chemical Sensitivities: Some cleaning products also contain disinfectants. The U.S. EPA notes that one major concern from a health standpoint is the increased incorporation of antimicrobial agents and fragrances in cleaners and air fresheners marketed to reduce indoor air contamination (1). Many commonly used disinfectant or sanitizer products contain chlorine, phenol, quaternary ammonium compounds, and isopropyl and other alcohols. These produce hazardous fumes and present access barriers for people with chemical sensitivities. **Electromagnetic Fields:** For people who are electromagnetically sensitive, the presence of cell phones and towers, portable telephones, computers, fluorescent lighting, unshielded transformers and wiring, battery re-chargers, wireless devices, security and scanning equipment, microwave ovens, electric ranges and numerous other electrical appliances can make a building inaccessible. The National Institute for Occupational Safety and Health (NIOSH) notes that scientific studies have raised questions about the possible health effects of EMF’s. NIOSH recommends the following measures for those wanting to reduce EMF exposure – informing workers and employers about possible hazards of magnetic fields, increasing workers’ distance from EMF sources, using low-EMF designs wherever possible (e.g., for layout of office power supplies), and reducing EMF exposure times (11).

Renovation/Remodeling/Furniture: Many new building materials, such as paints, adhesives, wallboard, carpet, and insulation, as well as upholstered furniture, particleboard cabinets, and other furnishings emit hazardous volatile organic compounds (VOC’s), contribute to poor indoor air quality (IAQ) and create significant access barriers for people with asthma and/or chemical sensitivities. These materials often outgas and are problematic for prolonged periods of time.

Smoke & Combustion: Many people with asthma and most people with chemical sensitivities are made sick by exposure to: 1) smoke, such as that from tobacco, fireplaces, candles, incense, and barbecues, and other outdoor fires, 2) vehicle and other engine exhaust, especially exhaust from vehicles using diesel or oxygenated fuel, and 3) combustion appliances burning kerosene, propane, or natural gas (natural gas usually being better tolerated than kerosene or propane). If combustion appliances are used, they should be directly vented to the outdoors. Electrical appliances are preferred by people with chemical sensitivities.

Noise & Vibration: Noise and vibration from HVAC systems, vacuums, pumps, helicopters and other sources can trigger severe symptoms, including seizures, in susceptible individuals.

Synergistic Effects of Indoor Air Pollutants: Indoor air is a “chemical soup” made up of a variety of chemicals emitted by building materials, cleaning products, pesticides, personal care and consumer products, emissions from building equipment and activities, etc. While individual chemicals may be hazardous, combinations of chemicals can be even more hazardous through additive or synergistic effects. Synergistic effects.

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....buildings or occupancies that may be appropriate for having such rooms, the minimum criteria for such a designation, and who would benefit from having these rooms. Promising Practices In November 2001 the State of California adopted a Cleaner Air Symbol and Conditions of Use in its building code to identify areas in publicly funded or leased facilities owned by the State of California that are accessible to and useable by people who are adversely impacted by airborne chemicals or particulate(s) and/or the use of certain electrical fixtures or devices. (1) The symbol can be used when minimum conditions established in the code are met. Use of the designation is voluntary. A fact sheet on the California Cleaner Air Symbol and Criteria can be found at: http://www.documents.dgs.ca.gov/dsa/pubs/cleanerair_factsheet.pdf See 1117B.5.11 Cleaner air symbol (page 109) of the California Code of Regulations for the code language: (see Appendix A) www.documents.dgs.ca.gov/dsa/pubs/regulations_02-16-05.pdf

Recommended Actions: The Committee was charged with 1) reviewing the California symbol and criteria and investigating where it has been implemented, how it has worked, and what modifications and improvements, if any, are necessary to recommend broader usage; 2) developing and promoting a national Cleaner Air Symbol and Conditions of Use as appropriate; and 3) defining the scope of guidelines for creating an ideal zone (room and path of travel) hereafter referred to as a Clean Air Room in buildings for

people with chemical and/or electromagnetic sensitivities. During the project, the scope of work was expanded to include a brief discussion of accommodations for people with multiple chemical and/or electromagnetic sensitivities to address the needs of those individuals for whom a Cleaner Air Room would not provide adequate access or for those situations when such a designation would not be possible or feasible. Resources that address access and accommodations for people with multiple chemical and/or electromagnetic sensitivities at work, at school, at public meetings, and in hospitals are included at the end of this report. Committee Recommendations •The Committee highly recommends that the Access Board and/or the National Institute of Building Sciences (NIBS) fund or seek funding for FY2006 to develop specifications for designing and constructing a Clean Air Room and Path of Travel, the ideal or model room. This project is a natural outgrowth of the work of the other three committees. •The Committee proposes a Pilot Project for FY2006 to implement a national Cleaner Air Symbol, as promulgated by the State of California, and Conditions of Use, as modified in the National Cleaner Air Signage, Conditions of Use section below, in public and commercial buildings such as independent living centers, disability organizations, schools and other educational institutions, public meeting places, or other business or government entities. The Committee recommends that one or more committee members in conjunction with the Access Board and/or the National Institute of Building Sciences assist in its implementation, track its use, analyze how well it has worked, and determine whether modifications or improvements are necessary prior to recommending promotion nationally. This same group would also examine implementation of the California Signage which is expected to take place during the same time frame. •The Committee recommends that the Access Board, or a committee created by the Board, identify, review, summarize, and publish best practices for accommodations for people with multiple chemical and/or electromagnetic sensitivities on the website. Such a project was previously proposed by Access Board officials and discussed with members of this Committee but was not part of the charge of the current project.

NATIONAL CLEANER AIR SIGNAGE

Background: In November 2001 the State of California adopted the California Cleaner Air Symbol, California Building Code, Title 24, Parts 2 and 12, 1117B.5.11ff., which established a symbol and criteria for conditions of use to identify a room, facility, and paths of travel that are accessible to and useable by people who are adversely impacted by airborne chemicals or particulate(s) and/or the use of electrical fixtures and/or devices. Installation and use of the Cleaner Air Symbol is on a voluntary basis in state buildings. The Committee learned that the Cleaner Air Symbol has yet to be implemented in California although members of our group are aware of individuals in California and in other states who are using the symbol as a means of advocating for or obtaining individual access needs. The California Cleaner Air Symbol and Conditions of Use were

also proposed for adoption at the meeting of the Accredited Standards Committee A117 on Architectural Features and Site Design of Public Buildings and Residential Structures for Persons with Disabilities in December 2001. (2) The Cleaner Air Symbol received a favorable vote. It was later dropped prior to the issuance of the final standard in 2003: International Code Council, American National Standard-Accessible and Useable Buildings and Facilities, ICC/ANSI A117.1-2003. The Cleaner Air Symbol is expected to be reintroduced for consideration during a new standard cycle that will begin shortly. The Standard must be adopted by a state or locality to be enforceable. The Committee also discussed the identification of state buildings in California that might qualify for the Cleaner Air Symbol either due to a building's unique ability to meet the implementation criteria, or the need to make public meeting rooms accessible for those with chemical and/or electromagnetic sensitivities. Committee members are also aware of the need to encourage residents of California who may need to access state buildings to seek to implement the Cleaner Air Symbol. Purpose: To provide voluntary guidelines for a Cleaner Air Symbol that can be used nationally or adapted for state and local use.

National Cleaner Air Symbol: The national symbol shall be the standard used to identify a room, facility, and paths of travel that are more accessible to and useable by people who are adversely impacted by airborne pollutants, such as those with chemical sensitivities, asthma, and other respiratory conditions, and/or people who are adversely impacted by electromagnetic fields from electrical fixtures and equipment such as those with electromagnetic sensitivities. The Symbol will comply with the specifications as described in the California code. When the Cleaner Air designation symbol is used, the following requirements must be met: •The symbol and text, "Cleaner Air" is displayed within a minimum 6-inch square; •The "Cleaner Air" text is located under the symbol, as shown •The Cleaner Air Symbol is shown as either a negative or positive image. •The symbol and text are posted in either black and white, or in Federal Blue and white. When blue is used, Federal Blue Color No. 15090, Federal Standard 595B, is used. •There is at least a 70% color contrast between the backgrounds of the sign and the surface that it is mounted on. Conditions of Use The Cleaner Air Symbol may be posted to identify the room and path of travel if there is verification that the room, facility, and path of travel to the room meet all of the Cleaner Air Requirements as indicated below: •No Smoking •Fragrance-Free •Pesticide-Free (Indoors and Outdoors) •Least Toxic/Risk Cleaning Products •No Recent Construction or Remodeling Including Carpet Installation •Cell phones turned off •Ability to turn off or unplug computers and other electrical equipment by occupant or staff •Ability to turn off fluorescent lighting by occupant or staff •Ability to adjust temperature and air flow by occupant or staff, or the availability of operable window(s) Paths of Travel Every effort should be made to make the Paths of Travel as accessible as possible for those with multiple chemical and/or electromagnetic sensitivities even though the paths of travel might not meet all of the criteria of the Cleaner Air Room. It is important that the Path of Travel from the building entrance to the Cleaner Air Room be as short as possible. The building entrance should also be fully accessible to those with mobility and other impairments.

Restrooms: If possible, restrooms that are already fully accessible to those with mobility and other impairments should be designated for use by those individuals using the Cleaner Air Room. These restrooms should be located along the path of travel or as close as possible to the Cleaner Air Room. The restrooms should meet as many of the criteria as possible. The restrooms should prohibit smoking and be free of perfumes, fragranced products, air fresheners, deodorizers, and pesticides. Cleaning should be done with the same least toxic products used in the Cleaner Air Room. Cell phones should be turned off along the path of travel and in the restrooms.

Contact Information for the building/facilities manager or the designated agent responsible for maintaining and/or recording activity in the Cleaner Air Room should be posted at the Cleaner Air Room and at the accessible entrance, if possible, and be readily available to anyone seeking additional information by telephone, fax, e-mail, or mail.

Maintaining a Cleaner Air Record Log. A log shall be maintained on site, accessible to the public either in person or by telephone, fax, e-mail, mail or other accessible means as requested. One or more individuals shall be designated to maintain the log. The log shall record any product or practice used in the designated Cleaner Air Room, the path of travel, and accessible restrooms, as well as scheduled activities that may impact the Cleaner Air designation. The log shall also include the product label and Material Safety Data Sheet(s), as available, for any products used. Note, however, that neither the MSDS nor the product label provides complete information on product ingredients or their potential health effects. Removal of The Symbol If the path of travel, room and/or facility restrooms identified by the Cleaner Air Symbol should temporarily or permanently cease to meet the minimum conditions as set forth above, the Cleaner Air symbol shall be removed and shall not be replaced until the minimum conditions are again met.

Temporary Use of Cleaner Air Symbol. The Cleaner Air Symbol may be used to identify a room, path of travel, and restrooms that meet the conditions of use on a temporary basis.

Further Explanation of the Criteria for Conditions of Use:

No Smoking: Smoking is prohibited in the path of travel, Cleaner Air Room, and restrooms serving the room. To qualify as a Cleaner Air Room, the room, path of travel, restrooms and surrounding area must be free of tobacco residue. Those who smoke, or who have tobacco residue on their person, would be prohibited from using the room. Smoking should be restricted to outdoor, designated smoking areas that are at a minimum of 100 feet from paths of travel, entryways, operable windows, and air intakes. (See No Smoking Policy, Operations and Maintenance Report) **Fragrance-Free:** Prohibit fragrance-emitting devices (FEDS), air fresheners, deodorizers, and similar products. Recommend that no fragranced, citrus-and/or pine-based products be used in cleaning or maintaining the room, path of travel, and restrooms. Any persons with perfume, cologne,

aftershave, as well as fragranced personal care and laundry products, would be prohibited from using the room. (See Fragrance-Free Policy, Operations and Maintenance Report) Pesticide-Free Indoors and Outdoors: Practice Integrated Pest Management. Use least hazardous pest management materials such as non-volatile baits, sticky traps, and boric acid with knowledge and input from those using the path of travel and Cleaner Air Room. The sign should be removed in the event of a least hazardous pesticide application for 24-48 hours because it is likely that the certified pest control applicator is in regular contact with chemical pesticides and could leave residue from clothing or equipment. In addition, some chemically sensitive individuals may be made sick by exposure to even least hazardous pesticides especially when they are first applied.

In the event of a chemical pesticide application made to the building or grounds, other than a least hazardous pesticide such as those listed above, remove the sign and consult with those who use the space and others regarding the length of time that the room would need to be closed to protect affected populations based on the product(s) used. (See Operations and Maintenance for least hazardous pest management materials and cautions in the event that a chemical pesticide application is considered for use in the Cleaner Air Room, Path of Travel, Restrooms, or the building or grounds.) Least Toxic/Risk Cleaning Products: Avoid or limit the use of products containing chlorine, ammonia, quaternary ammonium, phenol, isopropyl and other alcohols, formaldehyde, and other petroleum distillates. Do not use fragranced, citrus-and/or pine-based cleaning products as mentioned above. Consult those who plan to use the Cleaner Air Room and Path of Travel for cleaning product recommendations. Follow the recommendations of Operations and Maintenance Report for best practices. No Recent Construction or Remodeling Including Carpet Installation: Every effort should be made to avoid remodeling activities in the Cleaner Air Room, path of travel, and restrooms. Any remodeling activity would require removal of the signage. The length of time for removal should be determined by the type of activity, extent of the remodeling, and the products and materials selected for use. It is important to choose the least toxic, least problematic products and practices. Except for minimal touch up painting, for example, it would not be unusual to have the signage removal in effect for a period of 3- 6 months to a year or more depending on the nature and extent of the remodeling activity. Be sure to consult building occupants with existing health problems and those who are using the Cleaner Air Room for their input and to help determine when the Cleaner Air Room may again be safe for use. (See Products and Materials Report and Design and Construction Report for more information) Cell Phones Turned Off: Protect those with electromagnetic sensitivities and others who may be adversely affected by electrical equipment. Ability to turn off or unplug computers and other electrical equipment by occupant or staff: Protect those with electromagnetic sensitivities and others who may be adversely affected by computers and electrical equipment. Ability to turn off fluorescent lighting by occupant or staff: LEED (Leadership in Energy and Environmental Design) recommendations for

new construction call for individual control of lighting. (3) Newer fluorescents that contain electronic rather than magnetic ballasts may be less problematic for some people with electromagnetic sensitivities because they do not produce a visible flicker or audible hum. They are also less prone to trigger seizures. Ability to adjust temperature and air flow by occupant or staff, or the availability of operable window(s): LEED recommendations for new construction include individual control of temperature and ventilation. (3) Opening an operable window may improve the air quality or air flow in a Cleaner Air Room and compensate for situations when individual control of temperature and air flow is not possible. The text below is duplicated on the website.

RECOMMENDATIONS FOR ACCOMMODATIONS

People with chemical and/or electromagnetic sensitivities can experience debilitating reactions from exposure to extremely low levels of common chemicals such as pesticides, cleaning products, fragrances, and remodeling activities, and from electromagnetic fields emitted by computers, cell phones, and other electrical equipment. The severity of sensitivities varies among people with chemical and/or electromagnetic sensitivities. Some people can enter certain buildings with minor accommodations while others may be so severely impacted that they are unable to enter these same spaces without debilitating reactions. Furthermore, tolerances to specific exposures can vary greatly from one individual to the next. Meanwhile some exposures, such as the application of certain pesticides or extensive remodeling, for example, may be devastating to all chemically sensitive people and make a building or facility inaccessible for a substantial period of time. According to the Americans with Disabilities Act (ADA) and other disability laws, public and commercial buildings are required to provide reasonable accommodations for those disabled by chemical and/or electromagnetic sensitivities. These accommodations are best achieved on a case-by-case basis. Reasonable accommodations for a chemically sensitive and/or electromagnetically sensitive individual can include providing a space or meeting area that addresses one or more of the Cleaner Air criteria, upon request, such as

- Remove fragrance-emitting devices (FEDS)
- Delay or postpone indoor or outdoor pesticide applications, carpet cleaning, or other cleaning or remodeling until after the meeting
- Provide room or meeting area near exterior door or with window(s) that can be opened
- Require cell phones and computers be turned off
- Provide incandescent lighting in lieu of fluorescent lighting
- Provide at least one nonsmoking, fragrance-free person per shift to provide services (e.g. nurse, police officer, security guard, clerk)

For individuals who are unable to use or meet in a building or facility, or who are too severely impacted by chemical and/or electromagnetic exposures to use a designated Cleaner Air Room, accommodations may include:

- Meet an individual at the door or outside to conduct business
- Allow a person to wait outside or in car until appointment
- Provide a means, such as a phone, intercom, bell, or buzzer to summon staff to an outside door for

assistance •Permit business to be conducted by phone, fax, mail, or e-mail rather than in person •Allow participation in a meeting by speakerphone

SPECIAL ACKNOWLEDGEMENT: The Committee extends a generous thank you to Sharon Toji, Access Communications, for designing the Cleaner Air Symbol and making it available for public use.

REFERENCES 1) California Access Compliance Reference Manual, Division of the State Architecture, Chapter 11B Part 2 Title 24, California Code of Regulations 110 November 1, 2002. 2) American National Standards Institute (ANSI) Accredited Standards Committee A117, Committee on Architectural Features and Site Design of Public Buildings and Residential Structures for Persons with Disabilities, www.iccsafe.org/cs/standards/a117/index.html3) LEED Green Building Rating System for New Construction & Major Renovation, (LEED-NC), Version 2.1, US Green Building Council, pages 68 and 69. www.usgbc.orgLEED Controllability of Systems: 6.1 Provide at least an average of one operable window and one lighting control zone per 200 SF for all regularly occupied areas within 15 feet of the perimeter wall. 6.2 Provide controls for each individual for airflow, temperature and lighting for at least 50% of the non-perimeter, regularly occupied areas.

RESOURCES FOR ACCESS AND ACCOMMODATIONS Lamielle, M., Creating an Accessible Indoor Environment, Fact Sheet, National Center for Environmental Health Strategies, 2004. Lamielle, M., Multiple Chemical Sensitivity and the Workplace, National Center for Environmental Health Strategies, 2004. Temple, T., Healthier Hospitals, Ohio Network for the Chemically Injured, 1996. Miller, CS, Ashford, NA, Multiple Chemical Intolerance and Indoor Air Quality. In Indoor Air Quality Handbook, Spengler, J, Samet J and McCarthy J, Eds., New York, McGraw-Hill, Inc., 2000. Job Accommodations Network, a free service of the Office of Disability Employment Policy, U.S. Department of Labor, www.jan.wvu.eduUniversity of Minnesota, Disability Services, Internal Guidelines Regarding Multiple Chemical Sensitivity/Environmental Illness (MCS/EI), <http://ds.umn.edu/disabilities/MCSEIPolicy.html>The Evergreen State College, policy on air quality, www.evergreen.edu/policies/g-air.htm.

COMMITTEE Active Chair – Michael Mankin, Division of the California State Architect Libby Kelly, Council on Wireless Technology Impacts Mary Lamielle, National Center for Environmental Health Strategies Ann McCampbell, Multiple Chemical Sensitivities Task Force of New Mexico Susan Molloy, National Coalition for the Chemically Injured Toni Temple, Ohio Network for the Chemically Injured Contributing Mark Jackson,

Lennox Industries, Inc. R. Bruce McCreary, Snowflake, AZ Commenting Dora McGregor, Salt Lake City, UT

APPENDICES Appendix A - 1117B.5.11 Cleaner air symbol (page 109) of the California Code of Regulations 1117B.5.11 Cleaner air symbol. "STRICTLY FOR PUBLICLY FUNDED FACILITIES OR ANY FACILITIES LEASED OR RENTED BY STATE OF CALIFORNIA. NOT CONCESSIONAIRES". This symbol shall be the standard used to identify a room, facility and paths of travel that are accessible to and usable by people who are adversely impacted by airborne chemicals or particulate(s) and/or the use of electrical fixtures and/or devices. When used, the symbol shall comply with Figure 11B-40. 1117B.5.11.1 Color and size of symbol. The symbol shall be used when the following minimum conditions are met. The symbol, which shall include the text "Cleaner Air" as shown, shall be displayed either as a negative or positive image within a square that is a minimum of 6 inches on each side. The symbol may be shown in black and white or in color. When color is used, it shall be Federal Blue (Color No. 15090 Federal Standard 595B) on white, or white on Federal Blue. There shall be at least a 70% color contrast between the background of the sign from the surface that it is mounted on. Strictly for publicly funded public facilities or any facilities leased or rented by State of California. Not concessionaires. * In 1117B.5.8.1 (Symbols of Accessibility) the title of this section is incorrectly worded, which is causing misunderstanding regarding proper standard reference. Change title to read 'International Symbol of Accessibility.' This will be submitted for correction in Rulemaking.

CALIFORNIA ACCESS COMPLIANCE REFERENCE MANUAL. DIVISION OF THE STATE ARCHITECT.

11B Part 2 Title 24 California Code of Regulations 110 November 1, 2002 1117B.5.11.2 Conditions of use. Use of the cleaner air symbol is voluntary. The cleaner air symbol shall be permitted for use to identify a path of travel, and a room or a facility when the following is met. 1. Floor or wall coverings, floor or wall covering adhesives, carpets, formaldehyde-emitting particleboard cabinetry, cupboards or doors have not been installed or replaced in the previous 12 months. 2. Incandescent lighting provided in lieu of fluorescent or halogen lighting, and electrical systems and equipment shall be operable by or on behalf of the occupant or user of the room, facility or path of travel. 3. Heating, ventilation, air conditioning and their controls shall be operable by or on behalf of the occupant or user. 4. To maintain "cleaner-air" designation only nonirritating, nontoxic products will be used in cleaning, maintenance, disinfection, pest management or for any minimal touch-ups that are essential for occupancy of the area. Deodorizers or Fragrance Emission Devices and Systems (FEDS) shall not be used in the designated area. Pest

control practices for cleaner-air areas shall include the use of bait stations using boric acid, sticky traps and silicon caulk for sealing cracks and crevices. Areas shall be routinely monitored for pest problems. Additional nontoxic treatment methods, such as temperature extremes for termites, may be employed in the event of more urgent problems. These pest control practices shall not be used 48 hours prior to placement of the sign, and the facility shall be ventilated with outside air for a minimum of 24 hours following use or application. 5. Signage shall be posted requesting occupants or users not to smoke or wear perfumes, colognes or scented personal care products. Fragranced products shall not be used in the designated cleaner-air room, facility or path of travel. 6. A log shall be maintained on site, accessible to the public either in person or by telephone, e-mail, fax or other accessible means as requested. One or more individuals shall be designated to maintain the log. The log shall record any product or practice used in the cleaner-air designated room, facility or path of travel, as well as scheduled activities, that may impact the Cleaner-Air designation. The log shall also include the product label as well as the *Material Safety Data Sheets (MSDS). 1117B.5.11.3 Removal of symbol. If the path of travel, room and/or facility identified by the cleaner air symbol should temporarily or permanently cease to meet the minimum conditions as set forth above, the cleaner air symbol shall be removed and shall not be replaced until the minimum conditions are again met.

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- Operable windows are preferred. Being able to open windows is an important access issue for chemically sensitive individuals and can be beneficial for other occupants in certain situations. Operable windows should be detailed to minimize air infiltration. Design to prevent pest problems. (Appendix 3)
- Use inert pest resistant materials. When treatment of wood is required, treating with disodium octaborate tetrahydrate may be among the safer options.
- Incorporate pest barriers such as termite shields, window screens, and bird screens in construction details. Bird and bat droppings pose great IAQ risks.
- Some pesticides such as boric acid are considered environmentally safe. If used, granular or gel forms are preferred. Care should be taken to ensure that particles do not infiltrate interior habitable space. Shield occupants from external sources of EMF. Windows with low e glazing, metal roof, and siding components may reduce certain interior EMF. (Reference 2)

Roof Design

- Pitched roofs are preferred, because they shed water quickly, clean the roof of pollutants and potential toxins, and are less prone to leakage.
- Inert roofing materials, such as coated metal or clay tile, are ideal. Note that galvanized metal presents a rust hazard and should be avoided.
- Flat roofs are not preferred. If used, membrane and high albedo (highly reflective to heat) type are recommended. Asphalt or modified bitumen built-up roofs are less preferable. (Reference 3)

Wall Design

- Use best design practices to prevent moisture and condensation within walls. Calculate dew points for each exterior wall (and roof) type to verify performance at each condition. Provide detail for all flashing and counter-flashing locations.

Foundation Design

- Provide under-slab vapor barriers, insulation, and damp-proofing to

prevent moisture infiltration and condensation. Protect stored building materials from water damage and mold growth. Avoid use of water-damaged or mold-affected materials. Plumbing, Mechanical and Electrical Equipment Properly insulate pipes to prevent condensation, especially within walls. Use modeling software to determine airflow and to ensure isolation of pollutant sources and adequate ventilation. Ventilate areas occupied by people with chemical sensitivities with goal of eliminating odors (ideally entire building). These ventilation rates meet or exceed all worldwide

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REFERENCES Reference 1 ASHRAE Fundamentals Handbook, 2001, 25.19:

[http://www.infiltec.com/inf-](http://www.infiltec.com/inf-larg.htm)

<http://www.argonair.com/pdf/Myth%20About%20Bldg%20Env.pdf>Reference

2P. Levallois, et al., “Prevalence and Risk Factors of Self-Reported Hypersensitivity to Electromagnetic Fields in California” and “An Evaluation of the Possible Risks from Electric and Magnetic Fields (EMF) From Power Lines, Internal Wiring, Electrical Occupations and Appliances.”

<http://www.dhs.ca.gov/ps/deodc/ehib/emf/RiskEvaluation/Appendix3.pdf>. Case study for EMF control (Research Triangle)

http://www.ncgreenbuilding.org/site/ncg/public/show_project.cfm?project_id=120 “EMF reduction: The team reviewed available literature on EMF and their threat to health and determined that while EMF radiation could be measured, its threat to humans had not yet been proven or disproved. Nevertheless, the team recommended adopting a philosophy of prudent avoidance toward EMF risks and undertook modifications of the building design to reduce occupant exposure. EMF radiation can be mitigated by distance and by shielding. Distance offers maximum protection and is “low-tech,” while the costs associated with shielding are high and the results are difficult to measure. Consequently, the design team chose to create “buffer zones” to reduce prolonged exposures in portions of the building that are occupied for long periods of time, such as the laboratories and offices. The largest sources of EMF were identified as the building’s transformers, the electrical rooms with their many cables, and the electrical conduit that was routed under the building atria. As a first step circulation and utility spaces were used to maximize the separation between a source and any potential receptors.” Reference 3 Fumes from activities involving the installation and repair of modified bitumen roofs.

<http://environmentalchemistry.com/yogi/chemicals/cn/Asphalt%20fumes.html> Reference 4 Chapter 59, Indoor Air Quality Handbook CFD (Computational Fluid Dynamics) Method for indoor Air Quality Studies. Qingyan Chen, Leon Glicksman, MIT.

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•Collaborative for High Performance Schools (CHPS) Section 01350 •Green Guard Environmental Institute - Certification Standards for Low Emitting Products for the

Indoor Environment •Green Seal – Environmental Standards •Green Guidelines for Healthcare – Materials and Resources •Reducing Occupant Exposure to Volatile Organic Compounds (VOCs) from Office Building Construction Materials: Non-Binding Guidelines - California Department of Health Services

Two of the key elements involved in the materials selection process are a component content screening (what chemicals and compounds are known to be a part of the material) and an emissions testing protocol. Both the California Section 1350 Specification and the Green Guard Standards recommend emissions testing based on the ASTM Method ASTM standards D-5116-97 and D- 6670-01. The Committee believes that both of these elements must be involved in making appropriate building material selections.

Overview - Design The Products & Materials Committee believes that particular attention is critical during building design to assure that the needs of chemically and electromagnetically sensitive people are accommodated to the greatest extent possible. In general, this means selection of construction materials that are low-emitting or non-emitting and selection of finishes that do not absorb or react with chemicals emitted by other materials or products in the building. To begin to address some of the concerns of electromagnetically sensitive persons, areas of the building can be designed to have reduced electromagnetic fields. By making indoor environments that are safer for the most vulnerable among us, we can create indoor environments that are healthier for everyone, especially children. Generally, this means selection of materials that are “hard” or non-porous where possible so that any chemicals that contact these materials are not retained in and re-emitted from them. Also, particular attention should be paid to selection of materials that will not require VOC-emitting chemicals later as part of maintenance. For instance, in designing building foundations and structures, particular attention should be paid to the need for preventing termite problems, since the pesticides commonly used to control termites can have a deleterious effect on humans, especially persons with multiple chemical sensitivities. So, even though the material itself might be low-emitting, the use of products meant to “preserve, protect, or maintain” the material selected might emit volatile fumes that degrade indoor environmental quality and result in a building that is not suitable for persons with MCS. In addition, during building design particular attention must be paid to choice of electrical appliances, equipment and products that may produce higher than necessary electromagnetic fields. The NIBS-IEQ Materials Committee recognizes that there are selections that can be made during building design and construction that can provide a more healthful environment for persons with electromagnetic sensitivities. A few of these considerations are:

- Incorporation of a foil vapor barrier or other metal shielding feature into the walls around electric equipment can reduce certain electromagnetic fields.

- Wireless (“bluetooth” type) connections should be avoided, or areas of their use should be "contained" by using foil-backed drywall or other incorporation of a foil or metal barrier.
- New construction should use twisted metal clad wiring and/or twisted wire placed in metal conduit.
- Fiber optic connectivity is preferred for computer networks communication because these data lines may be run without concern for stray emissions.

Overview – Building Operations and Maintenance: Vigilance is required to assure that materials brought into the building throughout the course of its life are consistent with the standards provided herein, and are consistent with the design intent of the building. For example, the Products & Materials Committee realizes that building operations and maintenance products might introduce materials that are not consistent with the initial design for an accessible, healthy building. Building managers must also pay close attention to materials brought into the building environment by tenants or others to assure that these materials are consistent with provision of an accessible, healthy building for persons with multiple chemical sensitivities, electromagnetic sensitivities, and/or other health disorders. For instance, a tenant may bring furniture in that does not meet the design criteria presented in this document, and these materials could have detrimental effects on air quality within the entire building, depending on the design of the HVAC system. In addition, the chemicals and compounds used for maintenance can degrade environmental quality and seriously affect persons with multiple chemical sensitivities. Other products that can have detrimental effects on IEQ and/or certain individuals include paints and other finishes, carpeting, appliances and other electrical equipment, and others.

CHPS Section 01350 Part 1.3B and 1.4D and GREENGUARD Allowable Emission Levels. The NIBS – IEQ Products & Materials Committee believes that the CHPS Indoor Air Quality Emissions Testing Standards and the Green Guard Allowable Emission Levels offer tested and reviewed approaches to material and product selection for buildings. Given the range of guidance and standards available for material selection, these two standards provide the most widely accepted processes for making material selections to construct buildings that are healthier for the general public. It should be noted that the NIBS –IEQ Products & Materials Committee does not believe that either of these standards offers an entirely acceptable solution for persons with MCS and EMS. However, they provide a starting point in making material selections, and they provide the best available guidance on component screening and materials emission limits. Making materials selections that meet either the CHPS or the Green Guard allowable emission levels should be considered an absolute minimum requirement in creating a building or environment that is accessible to persons with MCS and EMS. No designer or other person making material selections should choose any materials that do not at least

meet these standards. Even then, the other considerations discussed herein should be a part of the selection process to provide the best

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The California Office of Environmental Health Hazard Assessment has determined that the lowest, reasonably achievable level of formaldehyde (because it is equal to ambient air concentration) is 33 (milligrams per cubic meter) ug/m³, or 23 (parts per billion) ppb. Thus, the CHPS 01350 standard requires that a material must not emit a level of formaldehyde that results in a concentration of ½ of this level, or 16 ug/m³ (11 ppb). This limit is lower than the allowable emission level of the Green Guard standard. The NIBS – IEQ Products & Materials Committee believes that the 16 ug/m³ (11 ppb) level is a minimum requirement for formaldehyde emissions from building materials. Following is a list of typical building materials and some considerations for selection. Note that the considerations listed below are in addition to the recommended emissions standards from CHPS 1350 and Green Guard.

Adhesives and Sealants One objective of the IEQ-Products & Materials Committee is to reduce the quantity of indoor air contaminants created by adhesives and sealants that are potentially irritating and/or harmful to occupants of buildings. The use of VOC-emitting adhesives and/or sealants should be minimized to the greatest extent possible in order to create an accessible, comfortable environment for the greatest numbers of people. The designer should specify application of only the minimum amounts of these materials necessary for satisfactory completion of each installation task. Additionally, the designer should select products that have the lowest possible VOC emissions, according to the emissions testing information provided, while still meeting other performance requirements. Caution should be exercised when interpreting adhesive emission data because such data are usually provided without the associated installed products (e.g., flooring materials) and emissions from installed assemblies may differ from manufacturers' reported adhesive emission rates. If possible, adhesives that contain formaldehyde should be avoided. The Committee also recommends that paints and finishes be selected that do not contain biocides. In any building where adhesive use is necessary, it is a good practice to ensure that maximum ventilation is supplied during and after application of these products. Appliances can emit volatile fumes as well as create electromagnetic fields. Electromagnetic fields and radiofrequencies can jeopardize the functioning and safe access of electromagnetically sensitive individuals. Examples of indoor appliances which can provoke health problems include:

- cell and portable telephones,
- fluorescent lights,
- unshielded transformers and wiring,
- battery re-chargers,

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wireless devices including computers and personal communication services (“PCS”),

- security and scanning equipment,
- numerous common work place and household electronic appliances.

Many electrical appliances and equipment can be improved to

varying degrees by appropriate shielding, and/or by being located in areas remote from vulnerable individuals. It is not recommended that such equipment be eliminated from the built environment, but that exposure of vulnerable individuals to such equipment be voluntary or easily avoidable.

Ceilings Of particular concern to the NIBS-IEQ Products & Materials Committee are T-bar suspended ceilings used as return air plenums in buildings, because both sides of the panels come in contact with indoor air. In addition, penetrations for sprinklers, alarms, and smoke detectors may significantly increase the area exposed to emissions. Temperatures near ceiling surfaces and in return air plenums are usually higher than those in occupied zones and, as a result, increased emissions from ceiling materials may occur. The individual selecting ceiling materials should carefully consider the acoustic, fire, and aesthetic requirements for each space prior to material selection. Nonporous materials are now available that combine aesthetic, acoustical, and fire code requirements. Ceiling materials that contain organic materials present the possibility of mold contamination if the ceiling system becomes wet. Porous ceilings and ceiling finishes can also act as receptors for toxins and VOCs that are brought into the building and later re-emit them. Many ceiling tile products are made using urea formaldehyde. No products using urea formaldehyde should be allowed. Composite Wood Products (plywood, particle board, OSB, paneling, etc.) Because they emit formaldehyde and other VOCs, use of composite wood products should be minimized, if not eliminated. If it is absolutely necessary to use such products, the designer should select materials that meet the specified building criteria and are the lowest emitting products available according to emissions testing data. Formaldehyde emissions are of particular concern in composite wood products. Note that VOC-emitting wood preservatives may be used in some of these products. There are a number of manufacturers that are replacing formaldehyde adhesives in composite wood products with non-emitting adhesives and the Committee recommends using these alternative products whenever possible.

Fireproofing The use of fireproofing chemicals should be minimized when possible. Spray-on fireproofing can cause indoor air quality problems when chemical components are released into the air as a result of mechanical damage, air erosion, or deterioration of the binder. Also because spray-on materials have large, porous surface areas, they can act as sinks for adsorption and re-emittance of VOCs. If possible, seal the surface of spray-on fireproofing to reduce adsorption of VOCs. Ensure that the sealer: (a) will not change fire characteristics of the original fireproofing material; and (b) is not a high-VOC emitter. Also seal any . . .