

## **William D. Mele**

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### **EXPERTISE**

Indoor air quality investigations, contamination control, design and specification of controlled environments. Particular emphasis on isolation, identification and evaluation of contaminants of concern, (both gas and particle phase), determination of pollutant pathways, and the design and specification of contamination control systems and mechanisms. Design, evaluation, and retrofit of ventilation, humidification, and exhaust systems and integration into building HVAC systems. Forensic investigation of building systems and building envelop.

### **PRESENT POSITION**

President and CEO of Indoor Environmental Solutions, Inc. Littleton, Colorado Consultants and Manufacturers Representatives specializing in Filtration, Contamination Control, Controlled Environments and Indoor Air Quality

### **EDUCATION**

- BA Psychology Rutgers University 1972, Minor in the Natural Sciences;
- Colorado State University, Post Graduate (non-matriculating) "Advanced Environmental Health", "Industrial Hygiene", "Advanced Occupational Health", "Aerosols and Occupational Health", "Occupational Noise Control". 1994-1996
- Midwest Center for Occupational Health and Safety, University of Minnesota, Post Graduate (non-matriculating) "Industrial Occupational Toxicology", "Introduction to Occupational Epidemiology" 1996

#### Short courses:

- "Investigating and Mitigating Microbiological Contamination in Buildings", Mid-Atlantic Environmental Hygiene Resource Center, 1995
- "Air System Design and Retrofit", ASHRAE Professional Development Seminar, 1997
- "Asthma and Allergen Control", University of Tulsa Center for Research and Technology, and US EPA, 2000
- "Certified Residential Mold Inspector," Indoor Environmental Standards Organization 2005
- "Current Understanding & Advances in Mold Assessment Sampling and Analysis" Aerotech P&K 2005
- "Mold, Allergens, Sampling, and Data Interpretation" Environmental Microbiology Laboratory, 2006

### **QUALIFIED AS AN EXPERT**

Eagle County District Court, CO

Weld County District Court, CO

Westchester County District Court, NY

### **PROFESSIONAL EXPERIENCE**

**Indoor Environmental Solutions, Inc.** President. Responsibilities include: Design and application of air filtration systems for commercial and industrial applications, design, evaluation, implementation, and specification of controlled environments including, operating rooms, clean manufacturing facilities, surface finishing environments, data centers, fan systems, ventilation, humidification, and exhaust systems, indoor air quality investigations, mold investigation and consultation. Life cycle and life extension analysis of commercial and industrial HVAC and process cooling equipment.

**Superior Technology Filter Corp.** August 1986-January 1998. Manager of Technical Services. Responsibilities included: Development of sales accounts for air filter sales and service organization including products, services, and mechanical and energy conservation consultation. Worked with customers, engineers and independent contractors to evaluate building contaminants, indoor air quality, and system performances and effect system modifications. Lecture for customers and trade organizations on particle dynamics, principles of filtration, indoor air quality and product application.

**Denver Research Institute, University of Denver.** June 1986-August 1986. Assistant Project Administrator, Exxon Petroleum Overcharge Restitution Program. Assisted in developing and implementing the evaluation procedure for the processing and ranking of energy conservation proposals submitted in response to the Colorado Office of Energy Conservation request for proposals. Participated in Advisory Committee meetings resulting in determining recommendations for funding to the Governor.

**Mele Mechanical, Inc.** August 1977- June 1986. President and CEO of a small heating, ventilating and air-conditioning construction and service company employing up to thirty-five employees. Duties included estimating and contract procurement, project management, and sheet metal fabrication shop management. Supervised office and accounting staff as well as accounts payable and receivable. Was responsible for generating sales including design build projects, producing heat loss/heat gain calculations, project drawings and specifications.

**Thermal Systems, Inc.** October 1975-August 1977. Vice President and General Manager of a small heating and air conditioning company employing up to fourteen employees. Was in charge of shop and field production including project coordination and supervision. Established the service department and maintained accounts including hands-on repairs of commercial heating, air-conditioning, ventilation and refrigeration systems.

**Maintenance Elite, Inc.** September 1973-October 1975. Lead Man/Shop Foreman. Ran crews doing field installations of heating, ventilating and air-conditioning systems for commercial new construction and remodel projects. Worked from blue-prints in ordering materials and coordinating shop and field production. Was responsible for sheet metal fabrication, job scheduling and shop and field coordination.

## LICENSES AND CERTIFICATIONS EARNED

Council Certified Indoor Environmental Consultant  
Certified Residential Mold Inspector  
Denver, Colorado Class A Heating and Ventilating Supervisor;  
Environmental Protection Agency Universal Refrigerant Handler Certification;  
Colorado Real Estate Salesman

## PROFESSIONAL AFFILIATIONS

- **AIHA**, (American Industrial Hygiene Association). Full Member
- **AEE**, (Association of Energy Engineers), 1999 Energy Professional Development Award winner. (Retired)
- **ASHRAE**, (American Society of Heating, Refrigerating, and Air-conditioning Engineers). Member. Chairman of the Technical, Energy and Government Affairs Committee, (nine years), Chairman of the Technical Conference Committee, (ten years). Member of the Board of Governors, (ten years). Awarded the 1997 Vic Johnson Distinguished Service Award. Society First Place Winner Government Affairs Award, 1993. Corresponding Member Society Technical Committee TC2.4, Particulate Contamination and Particulate Contamination Control Equipment.
- **BOAC**, (Building Operators Association of Colorado). Past President.1991-1992, Member of the board of directors 5 years. (Retired)
- **CAHED**, (Colorado Association of Hospital Engineering Directors). Associate Member (Retired)
- **IAQA**, (Indoor Air Quality Association). Member (Board Member, local chapter)
- **IEST**, (Institute of Environmental Sciences and Technology). Senior Member (Retired)
- **Red Rocks Community College** adjunct faculty

## **SELECTED PROFESSIONAL PRESENTATIONS/PUBLICATONS**

- "Fan Performance as a Function of Filter Performance". Tri-Dim Filter Annual Sales Meeting, Laughlin, NV, 1994
- "Minimizing Surface Finishing Defects". Thompson Lacquer Sales School, 1994, Denver, CO
- "A Field Approach to Indoor Air Quality". AIPE Technical Conference, 1994 Westminster, CO
- "Air Filtration Technology". Pikes Peak Chapter ASHRAE, 1994, Colorado Springs, CO University of Colorado, Ph.D. Candidates Short Course, 1995, Red Rocks Community College, 1996, Lakewood, CO, Metro State College, 1995,1996,1998 Denver, CO, University of Colorado, Boulder, 1996, 1997, 1998
- "HVAC Design for Indoor Air Quality". Rocky Mountain Chapter ASHRAE Dinner Seminar, 1995, Denver, CO
- "Indoor Environmental Quality" Rocky Mountain Chapter ASHRAE Technical Conference, 1995, Denver, CO
- "Indoor Air Quality Standards Update". Colorado Association of Hospital Engineering Directors Spring Meeting, 1995 Fort Collins, CO
- "The Use of the Optical Particle Counter and the Piezo Balance for the Monitoring of Airborne Particulate Matter in Real Time". ASHRAE Society Annual Meeting 1995, San Diego, CA
- "Controlling Microbial Contamination in Buildings". Global-Con Technical Conference, 1996, Denver, CO
- "Indoor Air Quality and Diesel Emissions". Pikes Peak Chapter ASHRAE, 1996 Colorado Springs, CO
- "Controlling Diesel Emissions in Outside Air Intakes". Building Operators Association of Colorado Luncheon Seminar 1996, Denver, CO
- "Testing and Balancing Air Systems with Filtration Systems". National Environmental Balancing Bureau Technical Meeting, 1997, Denver, CO
- "Proposed ASHRAE Standard 62R". Rocky Mountain Chapter ASHRAE, 1997, Denver, CO
- "Managing Building Air Quality". Rocky Mountain Chapter ASHRAE Technical Conference, 1997, Denver, CO COPE Conference 1998, Denver, CO
- "Evaluating and Retrofitting Local Exhaust Systems". American Industrial Hygiene Association, Rocky Mountain Section Short Course, April 1999, Golden, CO
- "To Soot or Not to Soot: Identifying and Controlling Contaminant Deposition at Ceiling Diffuser Locations". Building Operators Association of Colorado luncheon January, 2000, Denver, CO
- "Chemical and Biological Assault: Can Our Buildings Be Protected?" Building Operators Association of Colorado Luncheon, December 2001, Rocky Mountain Chapter ASHRAE, January 2002, American Industrial Hygiene Association, Rocky Mountain Section Technical Conference, Golden, CO, September 2002
- "The HVAC System as a Contaminant Source" American Facilities Engineers Conference, Denver, CO, November 2003
- "Indoor Air, Keeping Your Building Green" United States Green Building Council, Denver, CO February 2005
- "Defining "Quality" in the Indoor Environment" Rocky Mountain Chapter ASHRAE Technical Conference, May 2005
- The control of microorganisms in the air in Colorado through the control of moisture. WD Mele Proceedings Globalcon '96, Association of Energy Engineers, 1996
- Life Extension Guidelines of Existing HVDC Systems. W. Mele et. al. EPRI, Palo Alto, CA 2007.1033976
- NATCHI TV. Certified Home Inspector Video Training Series, Residential Heating and Cooling Systems, Commercial Heating and Cooling Systems, Indoor Air Quality for Home Inspectors, Carbon Monoxide Testing and Evaluation for Home Inspectors 2008

## **COLLEGE INSTRUCTOR SEMESTER COURSES**

- Red Rocks Community College AEC-221, 3 Credit Hours, "Building Electrical and Mechanical Systems". Spring 2007 Spring 2008
- Red Rocks Community College CON-269, 2 Credit Hours, "Productivity Improvement". Fall 2008

## **SIGNIFICANT PROJECTS COMPLETED**

## **Lafaye Residence Indoor Air Quality Assessment, 1996**

Lynne Lafaye 720-232-0132

Investigated complaints and possible causes of accumulation of soot within the approximately 6500 square foot residence in Edwards, Colorado. Emphasis of the investigation was centered around the gas fired equipment, especially the fireplaces. Specific problems were found with the installation of inadequate combustion air to the mechanical room, the absence of a make-up air system, and the utilization of a common flue for the furnaces and hot water heaters. There was also potential for a large volume of exhaust air due to numerous toilet fans, a high capacity kitchen hood, and a clothes dryer. Additionally there were six gas fired fireplaces, many of which were experiencing drafting problems. Furthermore, moderate to loose building construction, evidenced by windows that wouldn't close tightly, was contributing to stack effect problems with resultant building depressurization. Products of combustion, including carbon dioxide, carbon monoxide and fine particulate matter, were being released into and accumulating in the indoor environment. Remedies included removing the common mechanical room flue and replacing it with two separate flues, tightening up poorly installed windows and seals, the installation of a make up air unit, increasing the combustion air to the mechanical room, derating of gas burner orifices for altitude, and installing vent booster fans for fireplaces flues. Follow up included testimony in Eagle County District Court on behalf of plaintiff Lynne Lafaye.

## **Thirteen Building Air Quality Survey, 1997**

**Carr America, Denver, CO**

Contact Bob Goldman 303-221-8800

Approximately 1.33 million square feet in 13 multiple story commercial office buildings. Conducted baseline Indoor Air Quality studies for the purpose of establishing existing conditions in each building for future reference and to uncover any potential HVAC or IAQ problems. The HVAC systems were inspected for life cycle condition, operational soundness and deficiencies impacting indoor air quality and equipment hygiene. Air quality study strategy involved area sampling for formaldehyde, total volatile compounds, carbon dioxide, carbon monoxide, respirable aerosol mass concentration, temperature and relative humidity, and bulk water from cooling towers for legionella. A written report was followed up with personal discussions with appropriate maintenance personnel to discuss specific concerns.

## **Baseline Indoor Air Quality Assessment of Weld County Schools, 2004**

**Weld County School District 6, Greeley, CO**

Contact - Mike Upchurch, Risk Manager, 907-302-1000

Conducted baseline indoor environmental quality assessments for numerous educational and administrative buildings operated by a northern Colorado school district. The indoor environmental quality assessment investigated two basic elements of building environments – the mechanical systems, (air handling units, boilers, chillers, cooling towers, condensing units, exhaust systems), and systems not directly related to the air systems (i.e., Environmental Systems), which included illumination, hazardous chemical identification and storage, and potential biological reservoirs.

The assessment included the following systems and parameters:

- a) System type for each building and locations (e.g., single zone rooftop, unit ventilator, DX vs. chilled water cooling, etc.), which was compared to the equipment schedules and inventory provided by the school district.
- b) Boiler rooms for proper combustion/relief air, proper flue arrangements, proper flue sizing and flue corrosion, and possible conditions that could cause back-drafting.
- c) Outside air components (minimum position damper, full economizer, etc.).
- d) Intake locations and zones served, with emphasis on proximal pollutant sources.
- e) Current equipment condition (equipment hygiene, life expectancy, presence of standing water, evidence of water damage, microbial growth, etc.).
- f) Other operating conditions that might impact system performance (broken fan belts, inoperable dampers, integrity and efficiency of filter systems, etc.).
- g) Appropriate mechanical system interlocks (exhaust fan and make-up air units).
- h) Building static pressure.
- i) Air quality parameters over an 8-hour period which included carbon monoxide, carbon dioxide, temperature and relative humidity.
- j) Long term passive sampling for VOCs and formaldehyde.

Assessments were followed with written reports for each of the approximately 30 locations and personal interviews and face to face meetings with maintenance and administrative personnel to discuss mitigation strategies.

### **Hotel Carbon Monoxide Evaluation 2004-2007**

#### **Vail Resorts, Vail Colorado**

Contact Craig George, Director Risk Management [craig@vailresorts.com](mailto:craig@vailresorts.com)

Conducted carbon monoxide study, assessment, and evaluation of 17 hotel properties in the western United States to determine the potential for occupant exposures to carbon monoxide. The studies consisted of visiting the various sites and examining all such pieces of equipment that generate or have the potential to generate carbon monoxide, (CO), gas, to evaluate the potential volume of CO from each source, to determine the potential pollutant pathway for exposure to CO from each source, and to determine the efficacy of any engineering controls currently in place, or required to be established, to minimize the exposure potential. This included the examination of all pertinent CO generators such as boilers, water heaters, furnaces, direct and indirect fired make-up air equipment, stand-by generators, gas-fired laundry equipment, gas and solid fuel fireplaces, kitchen cooking equipment, loading docks, parking garages, and temporary or portable fuel fired equipment such as carpet cleaning equipment and high pressure, high temperature washers.

The evaluation included the determination of the equipment condition, its life expectancy, potential installation or maintenance defects, and efficacy of engineering controls such as flue and combustion air suitability, boiler repairs or equipment installation or replacement. All equipment and applications were inventoried, defects and corrections identified, and repairs were monitored. Carbon monoxide detection devices were specified, installed and commissioned, and a CO monitoring program was developed and implemented at all locations.

### **Blackwater HVDC Converter Station Equipment Assessment, Evaluation and Replacement Recommendations, 2005-2006**

#### **Public Service Company of New Mexico**

Conducted an assessment and evaluation of the thyristor valve cooling system at a 200 megawatt converter station in Clovis, NM. Assessment included an inspection and review of the evaporative cooling tower and tube bundle, piping and pumping systems, cooling coils, water storage tanks, and heat rejection design parameters and control systems. The evaporative cooling system was determined to be approaching the end of its useful life cycle. A new dry-cooler system was proposed and conceptually designed with specifications developed for inclusion in an RFP issued by the local utility. Proposals were received and reviewed, ranked and recommended for subsequent contract award.

### **Henderson Mill Laboratory Ventilation Systems Engineering Review, 2006-2007**

#### **Phelps Dodge, Henderson Operations**

The primary focus of the investigation was to determine the adequacy of the second floor exhaust systems in the containment and removal of various process contaminants and by products. These include among others, perchloric acid vapors, acid digestion by-products and waste heat as from the Atomic Absorption Spectrometer. The specific systems included in the investigation were, the lab heating and ventilating unit, the perchloric acid fume hoods, and exhaust fans, the filter hoods and exhaust fan, the atomic absorption hoods, and the un-tempered make-up air fan systems. In addition, it was desired that any deficiencies in design or operation of the existing systems be revealed and that recommendations for system corrections or upgrades be identified.

### **Arsenic and Copper Fume Employee Exposure Assessment and Engineering Control Evaluation and Recommendations at a Copper Refinery in the Southwestern US, 2008**

#### **Freeport McMoRan, El Paso Operations**

An engineering and industrial hygiene study was conducted for the Anode Casting Department to identify potential engineering and/or work practice controls that may be implemented to reduce employee exposure to inorganic arsenic and to 8 hour TWA airborne copper fume or dust concentrations in and around the Anode Casting Operation. The casting operation involved the melting and casting of greater than 400,000 tons of copper per year resulting in employee exposures to arsenic and copper fume and dust. Upon completion of the walkthrough investigation, a detailed study strategy, addressing the areas of concern was conducted. The project deliverables for the three operations delineated, (tap hole and launder, copper anode quenching, and copper anode shakeout), included:

1. Preparation of a scientific opinion regarding exposures in applying the PEL for copper fume and copper dust
2. Offering of conceptual design options for mitigation strategies, focusing on engineering controls
3. Evaluation of administrative and PPE controls
4. Preparation of a final written report to management with specific recommendations for the reduction of employee exposure control