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Re: AC by Marriott - West San Jose Project
(October 31, 2018 Director's Hearing, Agenda Item 4.a; Project File No. HI7-023)

Dear Director Hughey, Deputy Director Do, Mr. Rivera, and Ms. Mathur:

Please accept the following supplemental comments submitted on behalf of Laborers International Union of North America, Local Union 270 and its members ("LIUNA") regarding the Initial Study and Mitigated Negative Declaration ("IS/MND") prepared for the AC by Marriott - West San Jose Project ("Project") (Project File No. HI7-023). Certified Industrial Hygienist, Francis "Bud" Offermann, PE, CIH, has conducted a review of the Project, the IS/MND and relevant appendices regarding the Project's indoor air emissions. Indoor Environmental Engineering Comments (Oct. 29, 2018) (attached). Mr. Offerman concludes that it is likely that the Project will expose future workers employed at the hotel to significant impacts related to indoor air quality, and in particular, emissions of the cancer-causing chemical formaldehyde. Mr. Offermann is one of the world's leading experts on indoor air quality and has published extensively on the topic.

Mr. Offermann explains that many composite wood products typically used in hotel construction contain formaldehyde-based glues which off-gas formaldehyde over a very long time period. He states, "The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particle board. These materials are

commonly used in residential and hotel building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims."

Formaldehyde is a known human carcinogen. Mr. Offermann states that there is a fair argument that full-time workers at the AC by Marriott project will be exposed to a cancer risk from formaldehyde of approximately 18.4 per million. This is almost double the Bay Area Air Quality Management District (BAAQMD) CEQA significance threshold for airborne cancer risk of 10 per million. Mr. Offermann states:

> With respect to this project, AC by Marriott - West San Jose, since this is a hotel, guests are expected to have short term exposures (e.g. less than a week), but employees are expected to experience longer term exposures (e.g. 40 hours per week, 50 weeks per year). The longer term exposures for employees is anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in residences and hotels.

Offermann Comments, p. 4. Mr. Offermann concludes that this significant environmental impact should be analyzed in an EIR and mitigation measures should be imposed to reduce the risk of formaldehyde exposure. *Id*., pp. 6-7. Mr. Offermann suggests several feasible mitigation measures, such as requiring the use of no-added-formaldehyde composite wood products, which are readily available. Offermann Comments, pp. 6-7. Mr. Offermann also suggests requiring air ventilation systems which would reduce formaldehyde levels. *Id*. Since the MND does not analyze this impact at all, none of these or other mitigation measures are considered.

When a Project exceeds a duly adopted CEQA significance threshold, as here, this alone establishes a fair argument that the project will have a significant adverse environmental impact and an EIR is required. Indeed, in many instances, such air quality thresholds are the only criteria reviewed and treated as dispositive in evaluating the significance of a project's air quality impacts. See, e.g. *Schenck v. County of Sonoma* (2011) 198 Cal.App.4th 949, 960 (County applies BAAQMD's "published CEQA quantitative criteria" and "threshold level of cumulative significance"). See also *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 110-111 ("A 'threshold of significance' for a given environmental effect is simply that level at which the lead agency finds the effects of the project to be significant"). The California Supreme Court made clear the substantial importance that an air district significance threshold plays in providing substantial evidence of a significant adverse impact. *Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 327 ("As the [South Coast Air Quality Management] District's established significance threshold for NOx is 55 pounds per day, these estimates [of NOx emissions of 201 to 456 pounds per day] constitute substantial evidence supporting a fair argument for a significant adverse impact"). Since expert evidence demonstrates that the Project will exceed the BAAQMD's CEQA significance

threshold, there is a fair argument that the Project will have significant adverse impacts and an EIR is required.

Mr. Offermann also notes that the high cancer risk that may be posed by the Project's indoor air emissions likely will be exacerbated by the additional cancer risk that exists from vehicle emissions from the adjacent Stevens Creek Boulevard and other nearby roadways. As the previous comments submitted by SWAPE point out, however, the applicant and City have not estimated the cumulative health risk impacts of the Project either on nearby sensitive receptors or future workers at the Project. *See* SWAPE Comment (Oct. 24, 2018). Consistent with SWAPE's observations, Mr. Offermann notes:

> The [IS/MND] does not assess the impact of existing or future traffic related emissions of $PM_{2.5}$ upon the outdoor or indoor air concentrations. The air quality analyses in this MND focuses only on the emissions (pounds/day) of air contaminants from construction and operation and compares these emissions to the requirements established by the Bay Area Air Quality Management District (BAAQMD). The MND contains no air dispersion calculations of the cumulative impact these project related emissions and existing emissions have upon the concentrations of air contaminants in the outdoor and indoor air that people inhale each day.

Offermann Comments, p. 6. Mr. Offermann identifies a rule adopted in San Francisco that identifies a level of PM2.5 that triggers the installation of air filter systems in new development. "The San Francisco Department of Public Health, 2014. Article 38, Enhanced Ventilation Required for Urban Infill Sensitive Use Developments, requires that air filtration, with a minimum efficiency of MERV 13 be installed to remove $PM_{2.5}$ from mechanically supplied outdoor air in all $PM_{2.5}$ impacted areas." Offermann Comments, p. 6. A PM2.5 impacted area includes "[a]ll areas within 500 feet of any freeway or high-traffic road way (defined as urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day), unless air dispersion modeling shows total (traffic and ambient) outdoor concentrations of less than an annual average of 10 $\mu g/m^3$ $PM_{2.5}$, are defined as $PM_{2.5}$ impacted areas." *Id*. Mr. Offermann concludes that:

> It is my experience that based on the high future traffic noise level of 79 dBA L_{dn}. (City of San Jose, 2018, Revised Public Review Draft Initial Study – Mitigative Negative Declaration, Table 14 - Predicted Future Traffic Noise Exposure) that the annual average concentration of $PM_{2.5}$ will be substantially higher than 10 $\mu g/m^3$, and warrant installation of MERV 13 air filters in all mechanically supplied outdoor air ventilation systems.

Id.

LIUNA has previously brought Mr. Offermann's indoor air pollution concerns to the attention of the City. During a Planning Commission hearing held on September 26,

2018 regarding a project proposed at 715 West Julian Street, Planning Department staff responded to the indoor air pollution concerns raised by LIUNA. During that hearing, staff claimed that a California Supreme Court decision – *California Building Industry Ass'n v. Bay Area Air Quality Mgmt. Dist.* (2015) 62 Cal.4th 369, 386 ("*CBIA"*) – ruled that this type of air quality impact need not be addressed under CEQA because future residents of a mixed use project are part of the project and CEQA does not require evaluation of health or other impacts of a project on itself. To the extent staff again takes the position that future workers are not worthy of considering health protections under CEQA because they are part of the AC by Marriott project, staff's responses would be incorrect as a matter of law. Indeed, rather than support staff's response, the California Supreme Court in *CBIA* expressly holds that potential adverse impacts to future users and residents from pollution generated by a proposed project ***must be addressed*** under CEQA.

At issue in *CBIA* was whether the Air District could enact CEQA guidelines that advised lead agencies that they must analyze the impacts of adjacent environmental conditions on a project. The Supreme Court held that CEQA does not generally require lead agencies to consider the environment's effects on a project. (*CBIA*, 62 Cal.4th at 800-801.) However, to the extent a project may exacerbate existing adverse environmental conditions at or near a project site, those would still have to be considered pursuant to CEQA. (*Id*. at 801) ("CEQA calls upon an agency to evaluate existing conditions in order to assess whether a project could exacerbate hazards that are already present"). In so holding, the Court expressly held that CEQA's statutory language required lead agencies to disclose and analyze "impacts on ***a project's users or residents*** that arise ***from the project's effects*** on the environment." (*Id*. at 800 (emphasis added).)

The carcinogenic formaldehyde emissions identified by Mr. Offermann are not an existing environmental condition. Those emissions to the air will be from the Project. Employees will be users of the hotel. Currently, there is presumably little if any formaldehyde emissions at the site. Once the Project, emissions will begin at levels that pose significant health risks. Rather than excusing the City from addressing the impacts of carcinogens emitted into the indoor air from the Project, the Supreme Court in *CBIA* expressly finds that this type of effect by the project on the environment and a "project's users and residents" must be addressed in the CEQA process.

The Supreme Court's reasoning is well-grounded in CEQA's statutory language. CEQA expressly includes a project's effects on human beings as an effect on the environment that must be addressed in an environmental review. "Section 21083(b)(3)'s express language, for example, requires a finding of a 'significant effect on the environment' (§ 21083(b)) whenever the 'environmental effects of a project will cause substantial adverse effects *on human beings,* either directly or indirectly.'" (*CBIA*, 62 Cal.4th at 800 (emphasis in original.) Likewise, "the Legislature has made clear—in declarations accompanying CEQA's enactment—that public health and safety are of great importance in the statutory scheme." (*Id*., citing e.g., §§ 21000, subds. (b), (c), (d),

(g), 21001, subds. (b), (d).) It goes without saying that the hundreds of future employees at the Project are human beings and the health and safety of those workers is as important to CEQA's safeguards as nearby residents currently living adjacent to the Project site.

For the above additional reasons, the IS/MND for the Project should be withdrawn, an EIR should be prepared, and the draft EIR should be circulated for public review and comment in accordance with CEQA. Thank you for considering these comments.

Sincerely,

Michael R. Lozeau
Lozeau | Drury LLP

ATTACHMENT

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Date: October 29, 2018

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From: Francis J. Offermann PE CIH

Subject: Indoor Air Quality: AC by Marriott - West San Jose

Pages: 9

Indoor Air Quality Impacts

Indoor air quality (IAQ) directly impacts the comfort and health of building occupants, and the achievement of acceptable IAQ in newly constructed and renovated buildings is a well-recognized design objective. For example, IAQ is addressed by major high-performance building rating systems and building codes (California Building Standards Commission, 2014; USGBC, 2014). Indoor air quality in homes is particularly important because occupants, on average, spend approximately ninety percent of their time indoors with the majority of this time spent at home (EPA, 2011). Some segments of the population that are most susceptible to the effects of poor IAQ, such as the very young and the elderly, occupy their homes almost continuously. Additionally, an increasing number of adults are working from home at least some of the time during the workweek. Indoor air quality also is a serious concern for workers in hotels, offices and other business establishments.

The concentrations of many air pollutants often are elevated in homes and other buildings relative to outdoor air because many of the materials and products used indoors contain and release a variety of pollutants to air (Hodgson et al., 2002; Offermann and Hodgson,

2011). With respect to indoor air contaminants for which inhalation is the primary route of exposure, the critical design and construction parameters are the provision of adequate ventilation and the reduction of indoor sources of the contaminants.

Indoor Formaldehyde Concentrations Impact. In the California New Home Study (CNHS) of 108 new homes in California (Offermann, 2009), 25 air contaminants were measured, and formaldehyde was identified as the indoor air contaminant with the highest cancer risk as determined by the California Proposition 65 Safe Harbor Levels (OEHHA, 2017), No Significant Risk Levels (NSRL) for carcinogens. The NSRL is the daily intake level calculated to result in one excess case of cancer in an exposed population of 100,000 (i.e., ten in one million cancer risk) and for formaldehyde is 40 µg/day. The NSRL concentration of formaldehyde that represents a daily dose of 40 µg is 2 $\mu g/m^3$, assuming a continuous 24-hour exposure, a total daily inhaled air volume of 20 m^3, and 100% absorption by the respiratory system. All of the CNHS homes exceeded this NSRL concentration of 2 $\mu g/m^3$. The median indoor formaldehyde concentration was 36 $\mu g/m^3$, and ranged from 4.8 to 136 $\mu g/m^3$, which corresponds to a median exceedance of the 2 $\mu g/m^3$ NSRL concentration of 18 and a range of 2.3 to 68.

Therefore, the cancer risk of a resident living in a California home with the median indoor formaldehyde concentration of 36 $\mu g/m^3$, is 180 per million as a result of formaldehyde alone. Assuming this project will be built using typical materials and construction methods used in California, there is a fair argument that future residents will experience a cancer risk from formaldehyde of approximately 180 per million. The CEQA significance threshold for airborne cancer risk is 10 per million, as established by the Bay Area Air Quality Management District (BAAQMD, 2017). There is a fair argument that this project will expose future residents to a significant airborne cancer risk of 180 per million, which is 18 times above the CEQA significance threshold. This impact should be analyzed in an environmental impact report ("EIR"), and the agency should impose all feasible mitigation measures to reduce this impact. Several feasible mitigation measures are discussed below and these and other measures should be analyzed in an EIR.

Besides being a human carcinogen, formaldehyde is also a potent eye and respiratory irritant. In the CNHS, many homes exceeded the non-cancer reference exposure levels (RELs) prescribed by California Office of Environmental Health Hazard Assessment (OEHHA, 2017). The percentage of homes exceeding the RELs ranged from 98% for the Chronic REL of 9 $\mu g/m^3$ to 28% for the Acute REL of 55 $\mu g/m^3$.

The primary source of formaldehyde indoors is composite wood products manufactured with urea-formaldehyde resins, such as plywood, medium density fiberboard, and particle board. These materials are commonly used in residential and hotel building construction for flooring, cabinetry, baseboards, window shades, interior doors, and window and door trims.

In January 2009, the California Air Resources Board (CARB) adopted an airborne toxics control measure (ATCM) to reduce formaldehyde emissions from composite wood products, including hardwood plywood, particleboard, medium density fiberboard, and also furniture and other finished products made with these wood products (California Air Resources Board 2009). While this formaldehyde ATCM has resulted in reduced emissions from composite wood products sold in California, they do not preclude that homes built with composite wood products meeting the CARB ATCM will have indoor formaldehyde concentrations that are below cancer and non-cancer exposure guidelines.

A follow up study to the California New Home Study (CNHS) was conducted in 2016-2018 (Chan et. al., 2018), and found that the median indoor formaldehyde in new homes built after the 2009 CARB formaldehyde ATCM had lower indoor formaldehyde concentrations, with a median indoor concentrations of 25 $\mu g/m^3$ as compared to a median of 36 $\mu g/m^3$ found in the 2007 CNHS.

Thus, while new homes built after the 2009 CARB formaldehyde ATCM have a 30% lower median indoor formaldehyde concentration and cancer risk, the median lifetime cancer risk is still 125 per million for homes built with CARB compliant composite wood products which is more than 12 times the NSRL 10 in a million cancer risk.

With respect to this project, AC by Marriott - West San Jose, since this is a hotel, guests are expected to have short term exposures (e.g. less than a week), but employees are expected to experience longer term exposures (e.g. 40 hours per week, 50 weeks per year). The longer term exposures for employees is anticipated to result in significant cancer risks resulting from exposures to formaldehyde released by the building materials and furnishing commonly found in residences and hotels.

Assuming that the hotel is constructed with CARB Phase 2 Formaldehyde ATCM materials, and is ventilated with the minimum code required amount of outdoor air, the indoor hotel formaldehyde concentrations are likely similar to those concentrations observed in residences built with CARB Phase 2 Formaldehyde ATCM materials, which is a median of 25 $\mu g/m^3$.

Assuming that the employees work 8 hours per day and inhale 20 m^3 of hotel air per day, the formaldehyde dose per work-day at the hotel is 167 µg/day.

Assuming that the hotel employees work 5 days per week and 50 weeks per year for 45 years (start at age 20 and retire at age 65) the average 70 year lifetime formaldehyde daily dose is 73.6 µg/day.

This is 1.84 times the NSRL of 40 µg/day and represents a cancer risk of 18.4 per million, which exceeds the CEQA cancer risk of 10 per million.

Outdoor Air Ventilation Impact. Another important finding of the CNHS, was that the outdoor air ventilation rates in the homes were very low. Outdoor air ventilation is a very important factor influencing the indoor concentrations of air contaminants, as it is the primary removal mechanism of all indoor air generated air contaminants. Lower outdoor air exchange rates cause indoor generated air contaminants to accumulate to higher indoor air concentrations. Many homeowners rarely open their windows or doors for ventilation as a result of their concerns for security/safety, noise, dust, and odor concerns (Price, 2007). In the CNHS field study, 32% of the homes did not use their windows during the 24-hour Test Day, and 15% of the homes did not use their windows during the entire

preceding week. Most of the homes with no window usage were homes in the winter field session. Thus, a substantial percentage of homeowners never open their windows, especially in the winter season. The median 24-hour measurement was 0.26 ach, with a range of 0.09 ach to 5.3 ach. A total of 67% of the homes had outdoor air exchange rates below the minimum California Building Code (2001) requirement of 0.35 ach. Thus, the relatively tight envelope construction, combined with the fact that many people never open their windows for ventilation, results in homes with low outdoor air exchange rates and higher indoor air contaminant concentrations.

The AC by Marriott - West San Jose is located close to roads with moderate to high traffic, and as a result has been determined to be a sound impacted site according to the Revised Public Review Draft Initial Study – Mitigative Negative Declaration (City of San Jose, 2018), Table 14 – Predicted Future Traffic Noise Exposure, exterior noise levels of up to 79 dBA L_{dn} may occur at upper floor facades of the proposed building.

As a result of the high traffic related outdoor noise levels, the current project anticipates the need for mechanical supply of outdoor air ventilation air to allow for a habitable interior environment with closed windows and doors. Such a ventilation system would allow windows and doors to be kept closed at the occupant's discretion to control exterior noise within residential interiors.

$PM_{2.5}$ Outdoor Concentrations Impact. An additional impact of the nearby motor vehicle traffic associated with this project, are the increased outdoor concentrations of $PM_{2.5}$. The Revised Public Review Draft Initial Study – Mitigative Negative Declaration (City of San Jose, 2018), does not assess the impact of existing or future traffic related emissions of $PM_{2.5}$ upon the outdoor or indoor air concentrations. The air quality analyses in this MND focuses only on the emissions (pounds/day) of air contaminants from construction and operation and compares these emissions to the requirements established by the Bay Area Air Quality Management District (BAAQMD). The MND contains no air dispersion calculations of the cumulative impact these project related emissions and existing emissions have upon the concentrations of air contaminants in the outdoor and indoor air that people inhale each day.

The San Francisco Department of Public Health, 2014. Article 38, Enhanced Ventilation Required for Urban Infill Sensitive Use Developments, requires that air filtration, with a minimum efficiency of MERV 13 be installed to remove $PM_{2.5}$ from mechanically supplied outdoor air in all $PM_{2.5}$ impacted areas. All areas within 500 feet of any freeway or high-traffic road way (defined as urban roads with 100,000 vehicles/day or rural roads with 50,000 vehicles/day), unless air dispersion modeling shows total (traffic and ambient) outdoor concentrations of less than an annual average of 10 $\mu g/m^3$ $PM_{2.5}$, are defined as $PM_{2.5}$ impacted areas.

It is my experience that based on the high future traffic noise level of 79 dBA L_{dn}. (City of San Jose, 2018, Revised Public Review Draft Initial Study – Mitigative Negative Declaration, Table 14 - Predicted Future Traffic Noise Exposure) that the annual average concentration of $PM_{2.5}$ will be substantially higher than 10 $\mu g/m^3$, and warrant installation of MERV 13 air filters in all mechanically supplied outdoor air ventilation systems.

Indoor Air Quality Impact Mitigation Measures

The following are recommended mitigation measures to minimize the impacts upon indoor quality:

- indoor formaldehyde concentrations
- outdoor air ventilation
- $PM_{2.5}$ outdoor air concentrations

Indoor Formaldehyde Concentrations Mitigation. Use only composite wood materials (e.g. hardwood plywood, medium density fiberboard, particleboard) for all interior finish systems that are made with CARB approved no-added formaldehyde (NAF) resins or ultra-low emitting formaldehyde (ULEF) resins (CARB, 2009).

Outdoor Air Ventilation Mitigation. Provide each habitable room with a continuous mechanical supply of outdoor air that meets or exceeds the California 2016 Building

Energy Efficiency Standards (California Energy Commission, 2015) requirements of the greater of 15 cfm/occupant or 0.15 cfm/ft^2 of floor area. Following installation of the system conduct testing and balancing to insure that required amount of outdoor air is entering each habitable room and provide a written report documenting the outdoor air flow rates. Do not use exhaust only mechanical outdoor air systems, use only balanced outdoor air supply and exhaust systems or outdoor air supply only systems. Provide a manual for the hotel management that describes the purpose of the mechanical outdoor air system and the operation and maintenance requirements of the system.

$PM_{2.5}$ Outdoor Air Concentration Mitigation. Install air filtration with a minimum efficiency of MERV 13 to filter the outdoor air entering the mechanical outdoor air supply system. Install the air filters in the system such that they are accessible for replacement by the hotel maintenance staff. Include in the mechanical outdoor air ventilation system manual instructions on how to replace the air filters and the estimated frequency of replacement.

References

Bay Area Air Quality Management District (BAAQMD). 2017. California Environmental Quality Act Air Quality Guidelines. Bay Area Air Quality Management District, San Francisco, CA. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

California Air Resources Board. 2009. Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products. California Environmental Protection Agency, Sacramento, CA. https://www.arb.ca.gov/regact/2007/compwood07/fro-final.pdf

California Building Code. 2001. California Code of Regulations, Title 24, Part 2 Volume 1, Appendix Chapter 12, Interior Environment, Division 1, Ventilation, Section 1207: 2001 California Building Code, California Building Standards Commission. Sacramento, CA.

California Building Standards Commission (2014). 2013 California Green Building Standards Code. California Code of Regulations, Title 24, Part 11. California Building Standards Commission, Sacramento, CA http://www.bsc.ca.gov/Home/CALGreen.aspx.

California Energy Commission, 2015. 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, California Code of Regulations, Title 24, Part 6. http://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf

Chan, W., Kim, Y., and Singer, B. 2018. Indoor Air Quality in New California Homes with Mechanical Ventilation, Proceedings of Indoor Air 2018, Philadelphia, PA.

City of San Jose, 2018, AC by Marriott - West San Jose, Revised Public Review Draft Initial Study – Mitigative Negative Declaration.

EPA. 2011. Exposure Factors Handbook: 2011 Edition, Chapter 16 – Activity Factors. Report EPA/600/R-09/052F, September 2011. U.S. Environmental Protection Agency, Washington, D.C.

Hodgson, A. T., D. Beal, J.E.R. McIlvaine. 2002. Sources of formaldehyde, other aldehydes and terpenes in a new manufactured house. Indoor Air 12: 235–242.

OEHHA (Office of Environmental Health Hazard Assessment). 2017. Proposition 65 Safe Harbor Levels. No Significant Risk Levels for Carcinogens and Maximum Allowable Dose Levels for Chemicals Causing Reproductive Toxicity. Available at: http://www.oehha.ca.gov/prop65/pdf/safeharbor081513.pdf

OEHHA - Office of Environmental Health Hazard Assessment. 2017. All OEHHA Acute, 8-hour and Chronic Reference Exposure Levels. Available at: http://oehha.ca.gov/air/allrels.html

Offermann, F. J. 2009. Ventilation and Indoor Air Quality in New Homes. California Air Resources Board and California Energy Commission, PIER Energy-Related Environmental Research Program. Collaborative Report. CEC-500-2009-085. https://www.arb.ca.gov/research/apr/past/04-310.pdf

Offermann, F. J. and A. T. Hodgson (2011). Emission Rates of Volatile Organic Compounds in New Homes. Proceedings Indoor Air 2011 (12th International Conference on Indoor Air Quality and Climate 2011). June 5-10, 2011, Austin, TX USA.

Price, Phillip P., Max Sherman, Robert H. Lee, and Thomas Piazza. 2007. Study of Ventilation Practices and Household Characteristics in New California Homes. California Energy Commission, PIER Program. CEC-500-2007-033. Final Report, ARB Contract 03-326. Available at: www.arb.ca.gov/research/apr/past/03-326.pdf.

San Francisco Department of Public Health, 2014. Article 38, Enhanced Ventilation Required for Urban Infill Sensitive Use Developments. https://www.sfdph.org/dph/EH/Air/Article38.asp

USGBC. 2014. LEED BD+C Homes v4. U.S. Green Building Council, Washington, D.C. http://www.usgbc.org/credits/homes/v4

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Education

- M.S. Mechanical Engineering Stanford University, Stanford, CA.
- Graduate Studies in Air Pollution Monitoring and Control University of California, Berkeley, CA.
- B.S. in Mechanical Engineering Rensselaer Polytechnic Institute, Troy, N.Y.

Professional Affiliations

ACGIH, AIHA, ASHRAE, CSI, ASTM, ISIAQ, PARMA, and USGBC

Work Experience

Mr. Offermann PE, CIH, has 36 years experience as an IAQ researcher, technical author, and workshop instructor. He is president of Indoor Environmental Engineering, a San Francisco based IAQ R&D consulting firm. As president of Indoor Environmental Engineering, Mr. Offermann directs an interdisciplinary team of environmental scientists, chemists, and mechanical engineers in indoor air quality building investigations. Under Mr. Offermann's supervision, IEE has developed both pro-active and reactive IAQ measurement methods and diagnostic protocols. He has supervised over 2,000 IAQ investigations in commercial, residential, and institutional buildings and conducted numerous forensic investigations related to IAQ.

Litigation Experience

Mr. Offermann has been qualified numerous times in court as an expert in the field of indoor air quality and ventilation for both plaintiffs and defendants. He has been deposed over 150 times in cases involving indoor air quality/ventilation issues in commercial, residential, and institutional buildings involving construction defects, and/or operation and maintenance problems. Examples of indoor air quality cases he has worked on are alleged personal injury and/or property damages from mold and bacterial contamination/moisture intrusion, building renovation activities, insufficient outdoor air ventilation, off gassing of volatile organic compounds from building materials and coatings, malfunctioning gas heaters and carbon monoxide poisoning, and applications of pesticides. Mr. Offermann has testified with respect to the scientific admissability of expert testimony regarding indoor air quality issues via Daubert and Kelly-Frye motions.