Federal Interagency Committee on Indoor Air Quality (CIAQ) Meeting Minutes

November 9, 2023

Moderator: Laureen Burton, U.S. Environmental Protection Agency

Meeting Overview

- Welcome, Announcements and Introductions
- Federal CIAQ Member Agency Updates (Pages 2–39)

- Indoor Air Quality (IAQ) Area of Interest Presentation

  CDC COVID-19 Ventilation Guidance

  Stephen Martin Jr., Ph.D., PE, CAPT, U.S. Public Health Service, Senior Research Engineer, CDC

  Kenneth Mead, Ph.D., Branch Chief, Engineering and Physical Hazards Branch, CDC

- Post-Meeting Updates and Announcements
  - The next CIAQ meeting will be held in February 2024.

U.S. Department of Energy (DOE)

Agency Point of Contact: Chris Early, 202-586-0514, chris.early@ee.doe.gov

Presentation Titled "Building America Program"

Recent Research Publication: "Mechanical ventilation and indoor air quality (IAQ) in recently constructed U.S. homes in marine and cold-dry climates." *Building and Environment*. November 2023. Antonopoulos CA, Rosenberg SI, Zhao H, Chan WR, Walker IS, Singer BC of PNNL and LBNL. https://www.sciencedirect.com/science/article/pii/S0360132323005073?via%3Dihub

The study presented here was part of a larger investigation developed and implemented—with support from DOE's Building America program—to answer critical questions about the types of ventilation systems that are being installed to meet a standard or code, variations by region and climate zone, installed performance, and mechanical ventilation impacts on IAQ. The study has four specific objectives: (1) investigate whether residential mechanical ventilation equipment is commonly installed correctly and meets the airflow and sound rating specifications of ASHRAE Standard 62.2–2010 and IRC 2012; (2) compare IAQ in homes with a whole-house mechanical ventilation (WHMV) system operating to IAQ in homes without a WHMV system operating when natural ventilation is not used, i.e., with windows closed, as occurs commonly in many U.S. homes; (3) collect data on sources, including monitoring of cooking burner use; and (4) assess the impact of controls other than WHMV, including bathroom and kitchen exhaust ventilation and filtration. The study was implemented in four regions of the United States with varied climates. This paper presents results for two of the study areas—the Marine climate of the Pacific Northwest (Oregon) and the Cold-Dry climate of the Mountain region (Colorado) during generally colder months—and focuses on the first two analysis objectives. Subsequent papers will present results from the companion studies in the Hot-Humid climate of the Southeast (mostly in Florida) and the Mixed-Humid/Cold Midwest (Illinois) and explore the other two objectives.

Data were collected to characterize WHMV and IAQ in 55 homes in the Marine climate of Oregon and the Cold-Dry climate of Colorado in the United States. Sixteen homes were monitored for 2 weeks, with and without WHMV operating. Measurements were taken of ventilation airflows; airtightness; time-resolved CO_2, $PM_{2.5}$ and radon; and time-integrated NO_2, NO_X and formaldehyde. Participants provided information about IAQ-impacting activities, perceptions and ventilation use. Thirty homes had equipment that could meet the ASHRAE 62.2–2010 standard with continuous or controlled runtime, and 34 had some WHMV operating as found. Thirty-five of 46 participants with WHMV reported that they did not know how to operate it, and only half of the systems were properly labeled. Two-week homes had lower formaldehyde, radon, CO_2 and NO (NO_X–NO_2) when operated with WHMV, and they had faster $PM_{2.5}$ decays following indoor emission events. Overall IAQ satisfaction was similar in Oregon and Colorado, but more Colorado participants (19% vs. 3%) felt their IAQ could be improved, and more reported dryness as a problem (58% vs. 14%). The collected data indicate that there are benefits of operating WHMV, even when continuous use may not be needed because outdoor pollutant concentrations are low and indoor sources do not present substantial challenges.

DOE is talking about these results; for instance, Lawrence Berkeley National Laboratory (LBNL) presented results of the study at the October 2023 conference of the Energy and Environmental Builders Association in Salt Lake City.

DOE Solid-State Lighting Program

Germicidal ultraviolet (GUV) radiation, also known as UV germicidal irradiation (UVGI), is a method of air and surface disinfection that may be more effective and energy efficient to reduce airborne disease transmission than such alternatives as energy-intensive high-ventilation solutions. DOE's GUV efforts are summarized here: https://www.energy.gov/eere/ssl/germicidal-ultraviolet-disinfection. Emerging GUV technologies represent an opportunity to realize additional energy savings through fixture design and application practices while maintaining the germicidal benefits. Currently, light-emitting diode (LED) GUV sources and fixtures have relatively low efficiency and lifetime, but there is headroom to improve through increased source efficiency, improved fixture design and enhanced reliability. In conjunction with proper ventilation and filtration, GUV is a promising technology for providing optimal IAQ to building occupants.

Ongoing research supported by DOE looks to improve our understanding of this emerging technology and its potential to deliver safer, healthier and more energy-efficient buildings.

Pacific Northwest National Laboratory (PNNL), in collaboration with LBNL, is researching effective, energy efficient and low-carbon methods to reduce airborne disease transmission in buildings. The teams are using both simulation tools and field studies to assess and compare the effectiveness and energy use of various measures (ventilation, filtration, germicidal ultraviolet disinfection, room air cleaners) to meet new CDC and ASHRAE design guidelines. Preliminary findings indicate that combining HVAC ventilation and filtration with GUV or room air cleaners may use 80% less energy for equivalent air disinfection compared to HVAC ventilation and filtration approaches alone. The teams are conducting additional research focused on GUV technology to better understand and quantify the technology's opportunities and risks.

Specific activities include:

- Simulation studies—PNNL and LBNL are evaluating the effectiveness, energy and economic impacts of IAQ strategies to achieve CDC and ASHRAE guidelines across different building types and climate zones. This work aims to provide guidance to stakeholders to identify and quantify the most effective, energy-efficient and affordable technologies to reduce airborne disease transmission. The first report from this work is in the process of being submitted to a peer-reviewed journal. Later in fiscal year (FY) 2024, the teams will expand the simulations to include airborne disease transmission and wildfire smoke contamination to understand impacts to IAQ strategies.
- GUV field evaluations (existing installations)—PNNL is conducting field evaluations at ten different commercial building applications where GUV technologies have been previously installed. PNNL is assessing effectiveness, safety, energy use, operations and maintenance impacts, and occupant acceptance of the installations. LBNL will conduct further evaluations of a subset of the installations to assess room air mixing, a key attribute for GUV effectiveness. A report is due in late FY 2024.
- GUV field evaluations (GSA GPG)—PNNL is working with the General Services Administration (GSA) Green Proving Ground (GPG) Program to evaluate GUV technologies at two different federal courthouse facilities. These sites will install and measure and compare the effectiveness and energy use of HVAC combined with filtration and GUV to achieve ASHRAE 241 and CDC clean air standards relative to HVAC approaches alone. Several types of GUV systems will be evaluated, including upper-room, whole-room, and in-duct solutions.

https://www.energy.gov/eere/buildings/articles/doe-and-gsa-select-20-green-technologies-test-real-world-buildings

- EPA and U.S. Army Corp of Engineers GUV Chamber Evaluation—PNNL is collaborating with the EPA and Army Corp of Engineers to evaluate the efficacy of GUV technologies in a test chamber with varying airflow and virus emission rates. PNNL is assisting with the design and selection of the GUV systems to be evaluated and will characterize the radiometric and energy performance of the GUV systems in the chamber.
- Framework development—PNNL, in collaboration with LBNL and researchers from the University of Colorado and Purdue University, have developed a recommended framework to improve the comparison of GUV to other measures used to reduce airborne diseases transmission, including ventilation and filtration. The framework will be submitted to a peer-reviewed journal in FY 2024.
- CALiPER Product Testing Program—https://www.energy.gov/eere/ssl/caliper. The availability of accurate GUV product performance data is essential to the safe and effective application of GUV technology. Many current GUV products have inaccurate performance data largely due to lack of mature test methods and lack of education of product developers on how to accurately test and report GUV product performance. Through this program, PNNL purchases and independently tests off-the-shelf GUV products using new and emerging test methods and produces reports to educate test method developers, product developers and buyers of how to accurately test, report and/or evaluate GUV product performance. The first report was published in September 2023; additional testing rounds and reports are coming in FY 2024. "Radiometric Testing of Germicidal UV Products, Round 1: UV-C Towers and Whole-Room." Jason Tuenge, Gabe Arnold, Margaret Axelson, and Jianchuan Tan. Pacific Northwest National Laboratory. https://www.energy.gov/sites/default/files/2023-09/ssl_caliper-guv-rd1-full.pdf

This report analyzes the independently tested performance of 13 GUV products purchased between February and July 2022. The products were of three different types, including consumer-oriented devices placed on the floor and other devices on the ceiling.

Testing identified numerous issues related to the accuracy of claimed GUV product performance. Claims were often untestable, contradictory or ambiguous or used incorrect units and/or terminology. When claims were testable, they often did not match test results. For example, three LED products that claimed to emit UV-C emitted only UV-A.

The UV-C–radiant efficiency of the products varied widely, even among similar products using the same source technologies.

Recent Research Publication: "DOE Solid-State Lighting Program, Germicidal Ultraviolet R&D Meeting," August 2022. Monica Hansen; LED Lighting Advisors Kyung Lee, Guidehouse, Inc., and Sean Donnelly, Guidehouse, Inc. https://www.energy.gov/sites/default/files/2022-10/ssl_rd-GUV_rdmtg_aug22.pdf. Twenty-three subject-matter experts on different aspects of GUV disinfection gathered at the invitation of DOE to help identify critical research and development (R&D) topic areas in GUV. Critical R&D topic areas: GUV Efficacy, Risk Research, GUV Source Technology, GUV Implementation, Standards & Regulatory. There also are reports for the two previous R&D meetings that were held in February 2021 and March 2022.

Recent Research Publication: "Energy Implications of Using Upper Room Germicidal Ultraviolet Radiation and HVAC Strategies to Combat SARS-CoV-2" from the August 2022 Summer Study on Energy Efficiency in Buildings, sponsored by the American Council for an Energy-Efficient Economy. Belal

Abboushi, Gabe Arnold, Jason Tuenge, Tim Salsbury: Pacific Northwest National Laboratory; Jason DeGraw: Oak Ridge National Laboratory; Ed Nardell: Harvard Medical School. https://www.energy.gov/sites/default/files/2022-08/ssl-abboushi-etal-2022-aceee-summer-study-guv-083122.pdf. The reviewed studies found that the germicidal efficacy of upper-room GUV (UR-GUV) equates to that of multiple air changes using pathogen-free air and is more effective at reducing infection risk than MERV 13 filtration. Regarding energy use, UR-GUV uses substantially less energy than mechanical air changes or increasing the introduction of outdoor air.

Recent Research Publication: "Operating Lifetime Study of Ultraviolet (UV) Light-Emitting Diode (LED) Products." April 2022. The authors of this report are all from RTI International. https://www.energy.gov/sites/default/files/2022-09/ssl-rti_uv-leds-lifetime_apr2022.pdf

Recent Research Publication: "Initial Benchmarks of UV LEDs and Comparison with White LEDs." November 2021. The authors of this report are all from RTI International. https://www.energy.gov/sites/default/files/2022-01/ssl-rti-uv-leds-nov2021.pdf

Office of State and Community Energy Programs

The Office of State and Community Energy Programs (SCEP) works with state and local organizations to significantly accelerate the deployment of clean energy technologies, catalyze local economic development and create jobs, reduce energy costs, and avoid pollution through place-based strategies that involve a wide range of government, community, business and other stakeholders.

Foundational programs like the Weatherization Assistance Program and State Energy Program, which both have more than 40 years of successfully delivering energy savings across the country, will complement newly formed programs, such as the Local Government Energy Program and Energy Futures Grants, enabling DOE to work with local governments and communities long term for the first time ever.

The Renew America's Schools grant (https://www.energy.gov/scep/renew-americas-schools-grant) is the flagship funding opportunity of the Renew America's Schools Program. This competitive award focuses on funding infrastructure upgrades at K–12 public school facilities, prioritizing high-need school communities. The most requested improvement is HVAC.

In response to high demand and the overwhelming evidence of public need, the DOE more than doubled the funding for Round 1 of the competition from $80 million to $178 million. After extensive review of a highly competitive field, on June 29, 2023, DOE announced 24 selectees.

DOE anticipates releasing a second round of funding in spring 2024.

The Energy Champions Leading the Advancement of Sustainable Schools Prize (Energy CLASS Prize, https://www.energy.gov/scep/energy-class-prize) is a two-phase, $4.5 million competitive award promoting capacity building and energy management in school districts across America. The competition was designed to help some of the nation's highest-need K–12 schools make critical clean energy and health improvements by establishing, training and supporting energy managers—or champions—in their districts. On May 5, 2023, SCEP announced 25 Phase 1 Winners of the Energy CLASS Prize. Phase 1 winners each received $100,000 in cash prizes, along with coaching and skills development from professionals in the newly established Energy CLASS Prize Training Network. At the

end of Phase 2, based on their performance, Phase 1 Winners will be eligible for an additional $50,000 in funding.

Lawrence Berkeley National Laboratory (LBNL)

Recent Presentation: "What's New with IAQ?" By DOE, EPA, and LBNL to the National Home Performance Conference in April 2023.

Ten new topics in IAQ are the following:

1. DOE updates on IAQ activities
2. IAQ and tax credits/rebates
3. EPA Indoor airPLUS Version 2
4. Kitchen ventilation and cooking
5. Unvented combustion
6. Control of infectious aerosols (new ASHRAE standard)
7. Decarbonization and IAQ
8. Multifamily buildings: leakage/compartmentalization
9. New filtration requirements
10. IAQ monitors and controls, new products, and applications

LBNL is also supporting the 2024 National Home Performance Conference by serving on the Review Committee for the Healthy Homes Track.

LBNL is working with the California Energy Commission (CEC).

- The Cooking Electrification and Ventilation Improvements for Children's Asthma (CEVICA) study, which is mostly funded by the California Energy Commission (CEC) but has DOE contributing support, is advancing, with the start of recruitment expected in December and field monitoring starting in January 2024. This study will look at IAQ and the health benefits of shifting to electric cooking in low-income homes of children with asthma in California's Central Valley.
- LBNL gave feedback to CEC (and their "CASE Study" contractors) on multifamily ventilation performance, compartmentalization effects and ventilation system selection.
- LBNL participated in CEC workshops on Ventilation Requirements in California building code (Title 24).

LBNL attended the International Energy Agency Annex 86 (Energy Efficient Indoor Air Quality Management in Residential Buildings) and Air Infiltration and Ventilation Centre meetings in Tokyo, Japan.

LBNL gave the following workshop presentations: "Airtightness Standards in the U.S.," "Airtightness Testing of Large Buildings" and "Airtightness and Internal Airflows in Multifamily Buildings."

LBNL gave presentations at the DOE Building Technologies Office peer review in April: "Achieving Health Benefits Through Electrification" (with Shannon Stendel of Slipstream) and "IAQ Monitors—Seeing the Invisible or Nothing at All?" (with two others)

Recent Research Presentation: "Quantifying the Potential Health Impacts of Unvented Combustion in Homes." 43rd AIVC -11th TightVent & 9th Venticool Conference (October 4–6, 2023) Copenhagen.

https://homes.lbl.gov/sites/default/files/2023-10/AIVC%20PRESENTATION%20-%202023.10.05_0.pdf. The paper is being published soon.

LBNL has started laboratory experiments recirculating range hoods in FLEXLAB to test contaminant removal efficacy and investigate differences in contaminant emissions from gas and induction cooking.

The joint International Electrochemical Commission and the American Society of Testing Materials test method for range hood capture efficiency has been updated and is now in review by IEC and shortly to be balloted by the American Society for Testing and Materials (ASTM).

LBNL is working with EPA on Indoor Air Plus V2. A couple of key highlights are recommendations to have HVAC filters (MERV 13) and have tighter building envelopes.

The Efficient and Healthy Schools Program of the Building Technologies Office

https://efficienthealthyschools.lbl.gov

Efficient and Healthy Schools Campaign Recognition Ceremony

On June 28, the Efficient and Healthy Schools Campaign recognized 17 schools and school districts for planning or implementing retrofits that improve energy efficiency and occupant health in their facilities. Assistant Secretary for Energy Efficiency and Renewable Energy Alejandro Moreno and staff from the Department of Education, EPA, and LBNL provided remarks.

Recent Webinar: "Guidance to Control Airborne Infection Risks—What Schools Need to Know"

In preparation for the new school year, there is new guidance from CDC and ASHRAE that schools can refer to when deciding what actions to take to reduce airborne infection risks. CDC recommends improving ventilation in buildings using basic strategies, as well as enhanced strategies to improve filtration, air disinfection and air flow to further reduce the concentration of virus particles in the air. ASHRAE's newly established Standard 241, Control of Infectious Aerosols, establishes minimum requirements for outdoor air ventilation system and air cleaning system design, installation, commissioning, operation and maintenance. On August 23, 2023, Kenneth Mead, Ph.D., PE, Chief of the Engineering and Physical Hazards Branch in the NIOSH Division of Field Studies and Engineering, and William Bahnfleth, Ph.D., PE, Chair of the ASHRAE Standard 241 Project Committee, discussed what schools must know to be better prepared to reduce airborne infection risks. https://efficienthealthyschools.lbl.gov/guidance-control-airborne-infection-risks.

Indoor Air Quality Training for Schools

The Center for Green Schools and DOE's Efficient and Healthy Schools Campaign, in coordination with EPA, hosted a free in-person training event June 21–22 for K–12 school staff who were working to improve IAQ. The training focused on developing or strengthening district IAQ management plans and sharing the most up-to-date best practices for continuous IAQ monitoring.

As part of this event, the campaign hosted a hybrid webinar—with speakers from EPA and Sacramento City Unified—that you can view on its website, along with helpful slides. "The Fundamentals of Federal Funding for School Buildings," July 7 (recorded, 1 hour) Speakers discussed the importance of an IAQ management plan as schools transition from pandemic responses. They discussed how to maintain and update a comprehensive IAQ management plan in schools, including the use of air monitoring to inform

decisions about building operations and improvements. https://efficienthealthyschools.lbl.gov/schools-iaq-management-webinar

"DOE COVID-19 Workplace Safety Framework"

This framework outlines the requirements to protect the health and safety of the workforce in DOE facilities and for the safe accomplishment of the DOE mission in a COVID-19 environment. There is guidance on when masks are required and when testing is required, among other things. The section on ventilation is short and recommends referring to the CDC ventilation guidance. May 26, 2023. https://www.energy.gov/sites/default/files/2023-05/DOE-COVID-19-Workplace-Safety-Framework-05-26-23_0.pdf

"Better Buildings Solution Center"

Better Buildings is an initiative of the DOE designed to improve the lives of the American people by driving leadership in energy innovation. Through Better Buildings, DOE partners with leaders in the public and private sectors to make the nation's homes, commercial buildings, and industrial plants more energy-efficient by accelerating investment and sharing successful best practices.

Recent Presentation: "Nothing to Sneeze At: Health Benefits of Electrification in Multifamily Housing." Electrification can decrease exposure to indoor air allergens and pollutants linked to such conditions as asthma and low birth weight. Watch this webinar to better understand how this information can lead to additional funding and support for building upgrades. September 12, 2023 (1 hour). https://betterbuildingssolutioncenter.energy.gov/webinars/nothing-sneeze-at-health-benefits-electrification-multifamily-housing

"The DOE Better Buildings Residential Network"

The DOE Better Buildings Residential Network, which is a network of more than 400 members that connects energy efficiency programs and partners to share best practices and learn from one another to increase the number of homes that are energy efficient, recently addressed IAQ in one of its ongoing series of webinars, which are called Peer Exchange Calls:

Recent Presentation: "Wildfires – How Can Residential Energy Efficiency Create a Healthier Indoor Environment?" August 10, 2023. Presentation slides available. Better Buildings Residential Network Peer Exchange Call Series. Eric Sun, International WELL Building Institute; Alysson Blackwelder, UL Solutions; Lisa Patel, Medical Society Consortium on Climate and Health; and open discussion. https://www.energy.gov/node/4832150

The Federal Facilities Council of the National Academies of Sciences, Engineering and Medicine is sponsoring the "GSA's Buildings and Health Research Program: A Federal Facilities Council Webinar Series."

DOE has been participating in The National Academies of Sciences Federal Facilities Council (FFC). The National Academies of Sciences, Engineering and Medicine (NASEM) is not a government agency, but it works with government agencies. More than 24 federal agencies participate. The FFC's mission is to identify and advance technologies, processes, and management practices that improve the performance of federal facilities over their entire life cycle, from planning to disposal. The GSA, which is a government agency, is the lead federal agency for this particular webinar series. The Office of Federal High-

Performance Green Buildings of the GSA has, over several years, conducted research on the impact of building design and operation on human health. NASEM, in partnership with GSA, hopes to build a consortium of organizations, including GSA and other federal and private sector partners, to promote strategies that optimize health and human productivity and to prevent illness. The series is designed to encourage the federal facilities community to pilot and eventually adopt health-enhancing strategies in their buildings and, wherever possible, these discussions will reflect on strategies to support the home office and those who work from home. Webinars are about 2 hours each, and recordings are available. You can find out more information here: https://www.nationalacademies.org/our-work/gsas-buildings-and-health-research-program-a-federal-facilities-council-webinar-series

MAY 23, 2023: "Health in Buildings Partnerships and GSA's Vision for the Future." The panelists described past efforts and a future vision to prioritize health-enhancing strategies for buildings, the tools and resources they and partner organizations have developed over the last 20 years to implement them, and the importance of partnerships in achieving our future vision.

JULY 27, 2023: "Enhanced Ventilation and Cleaner Air in Buildings." The panel discussed how GSA and other federal agencies are trying to provide cleaner, healthier indoor air through the Clean Air in Buildings Challenge. Panelists reviewed opportunities to improve air quality and ventilation in existing buildings, ASHRAE's new Standard 241 for Control of Infectious Aerosols in Buildings, and tools available from PNNL to evaluate the indoor environment in your building.

AUGUST 31, 2023: "Wellbuilt for Wellbeing." The Wellbuilt for Wellbeing research project measured indoor environments and human health and well-being using novel methods, including wearable physiological sensors and real-time experience sampling surveys. Our panelists discussed a broad range of findings from the project and addressed the importance of considering individualized needs by understanding the ways personality, office design and ambient conditions influence the happiness, focus and well-being of people working in commercial office buildings.

OCTOBER 24, 2023: "Health in Buildings Roundtable Scoping Meeting." The goal of this meeting was to bring together various stakeholder communities to discuss interest in the roundtable and identify key topics the roundtable should address. The FFC is actively looking for sponsors, particularly federal sponsors, to bring the roundtable to fruition. The hope is to procure 75% of the necessary funding by the end of the year to formally initiate this effort.

Centers for Disease Control and Prevention (CDC)

National Center for Environmental Health (NCEH)

Division of Environmental Health Science and Practice (DEHSP)

Presentation at the International Society of Exposure Science (Chicago, IL; August 28, 2023). Chew G, Sieling F, Adamkiewicz G, Forzani E, Sircar K. A novel volatile organic compound (VOC) sensor to predict airway inflammation in children.

- Improved methods to measure volatile organic compounds (VOCs) in real time can enhance environmental epidemiology studies.
- Real-time VOC sensors may provide better predictive ability for airway inflammation than traditional passive dosimeters alone.

Water, Food and Environmental Health Services Branch

New publication on the pandemic's effects on a Legionella water management program. Authors evaluated the COVID-19 pandemic's impact on building water quality and gaps in the literature about flushing effectiveness in controlling Legionella growth as part of a water management program (WMP) during long-term reductions in occupancy or water usage.

- The authors conducted this study through a partnership with a national lodging organization with more than 700 U.S. lodging facilities.
- This analysis provides needed evidence for the use of flushing to mitigate the impacts of building water stagnation, as well as the value of routine Legionella testing for WMP validation.
- WMPs remain the best tool to reduce the risk of Legionella growth and spread in building water systems.

Kunz JM, Hannapel E, Vander Kelen P, Hils J, Hoover ER, Edens C. Effects of the COVID-19 pandemic on Legionella water management program performance across a United States lodging organization. *Int. J. Environ. Res. Public Health.* 2023. 20, 6885.

Agency for Toxic Substances and Disease Registry (ATSDR)

Office of Community Health and Hazard Assessment

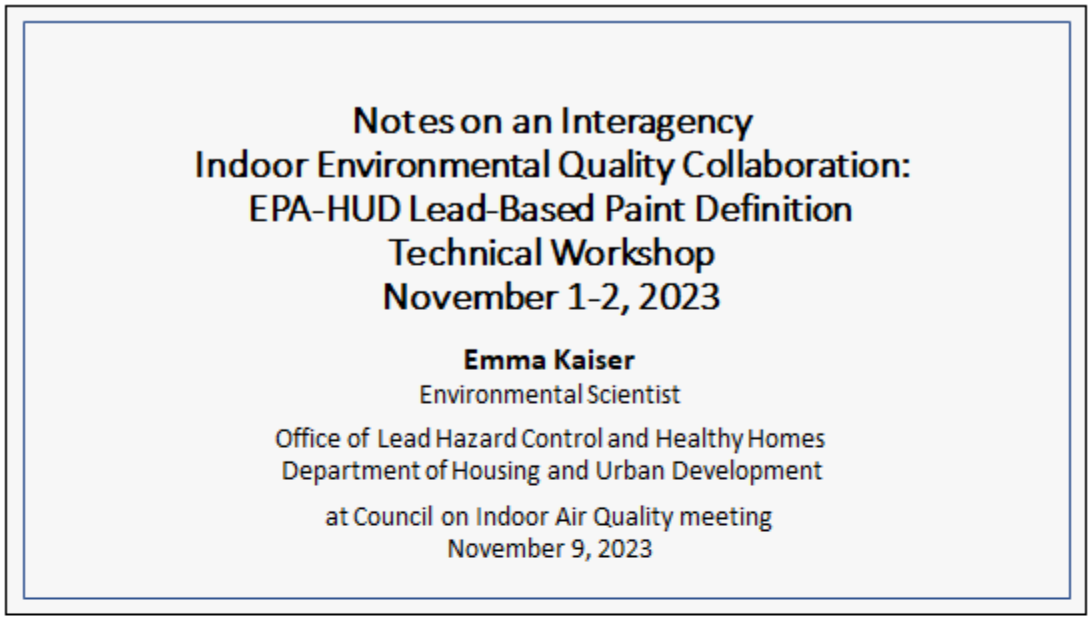
- Authors Tonia Burk, Brad Goodwin and Sandra Miller presented a poster titled, "A Comprehensive Approach to Health Assessment of Exposures from Petroleum Vapor Intrusion," at the International Society of Exposure Science conference in Chicago, IL in August 2023. The poster shared six criteria for screening out petroleum hydrocarbons from further evaluation in the vapor intrusion exposure pathway.
- Authors Tonia Burk and Sandra Miller presented a talk titled, "Updates to ATSDR's Vapor Intrusion Assessment Approach," at the National Environmental Health Association conference in New Orleans, Louisiana, in August 2023. The talk provided updates on methods for evaluating multiple lines of evidence, sources of indoor air contaminants, and temporal variability in vapor intrusion assessments. ATSDR's suite of vapor intrusion fact sheets and other resources also were shared.

Office of Innovation and Analytics

- New publication on microplastics exposure identifies unique liver effects associated with only one of the plastic-polymers, PVC. The research finds that PVC exposure causes liver toxicity and increases the risk of liver cancers, including angiosarcomas and hepatocellular carcinomas. This work draws mostly from worker and animal studies to suggest the unique liver effects potential for PVC exposure. The study reviewed microplastic worker inhalation studies, contrasting PVC from other microplastics and then following historical data as the PVC co-contaminant, vinyl chloride, was controlled.

Zarus GM, Muianga C, Brenner S, Stallings K, Casillas G, Pohl HR, Mumtaz MM, Gehle K. Worker studies suggest unique liver carcinogenicity potential of polyvinyl chloride microplastics. *Am. J. Industrial Med*. 2023. 1–15.

U.S. Department of Housing and Urban Development (HUD)

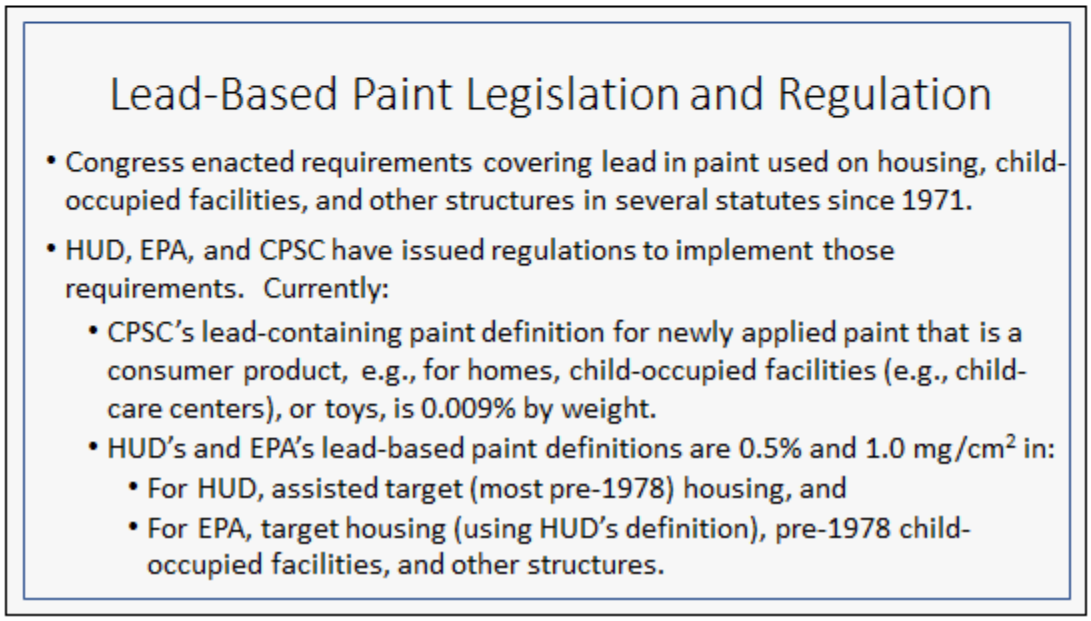


Notes on an Interagency
Indoor Environmental Quality Collaboration:
EPA-HUD Lead-Based Paint Definition
Technical Workshop
November 1-2, 2023

Emma Kaiser
Environmental Scientist

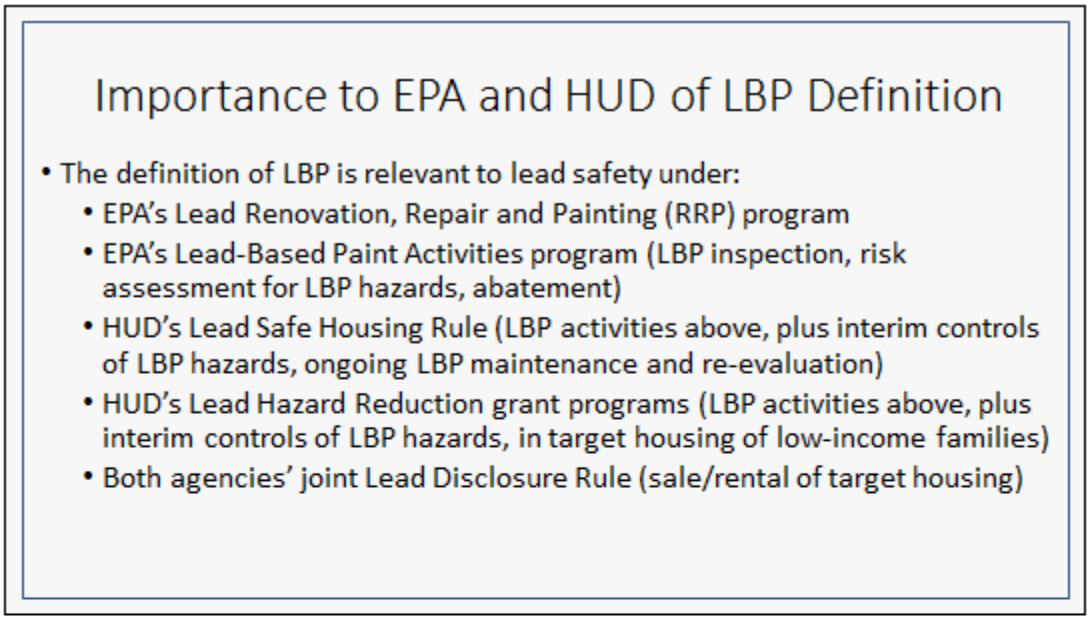
Office of Lead Hazard Control and Healthy Homes
Department of Housing and Urban Development

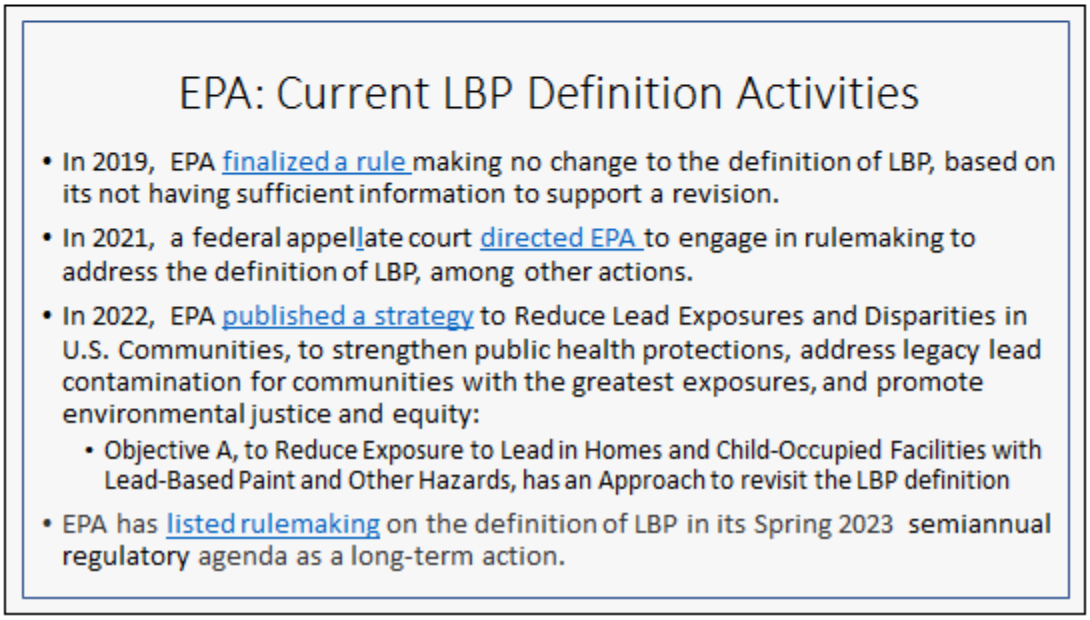
at Council on Indoor Air Quality meeting
November 9, 2023



Lead-Based Paint Legislation and Regulation

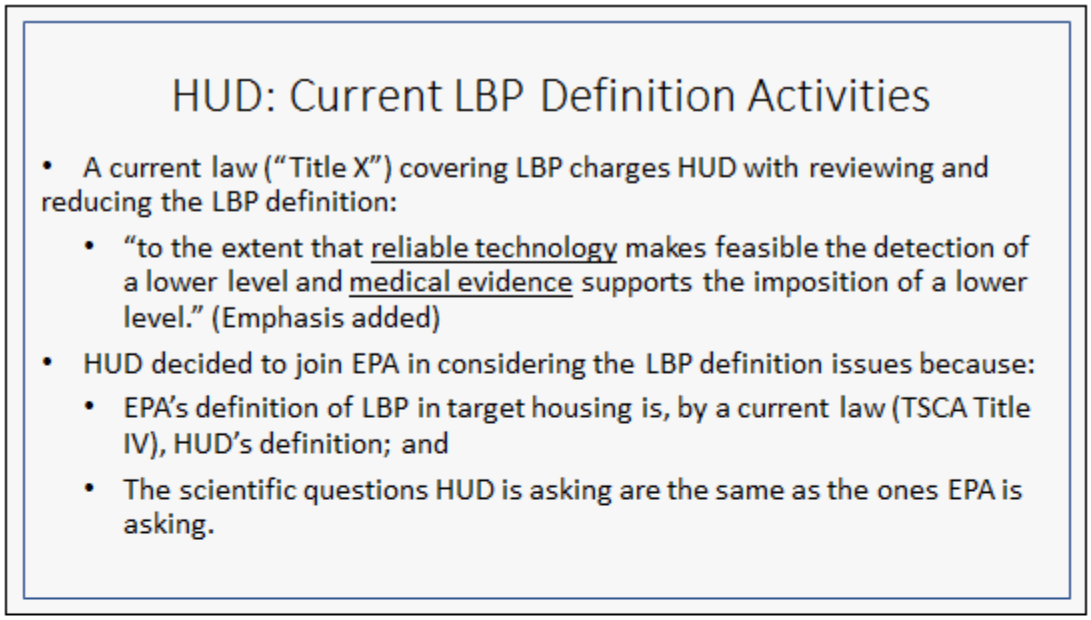
- Congress enacted requirements covering lead in paint used on housing, child-occupied facilities, and other structures in several statutes since 1971.
- HUD, EPA, and CPSC have issued regulations to implement those requirements. Currently:
  - CPSC's lead-containing paint definition for newly applied paint that is a consumer product, e.g., for homes, child-occupied facilities (e.g., child-care centers), or toys, is 0.009% by weight.
  - HUD's and EPA's lead-based paint definitions are 0.5% and 1.0 mg/cm^2 in:
    - For HUD, assisted target (most pre-1978) housing, and
    - For EPA, target housing (using HUD's definition), pre-1978 child-occupied facilities, and other structures.

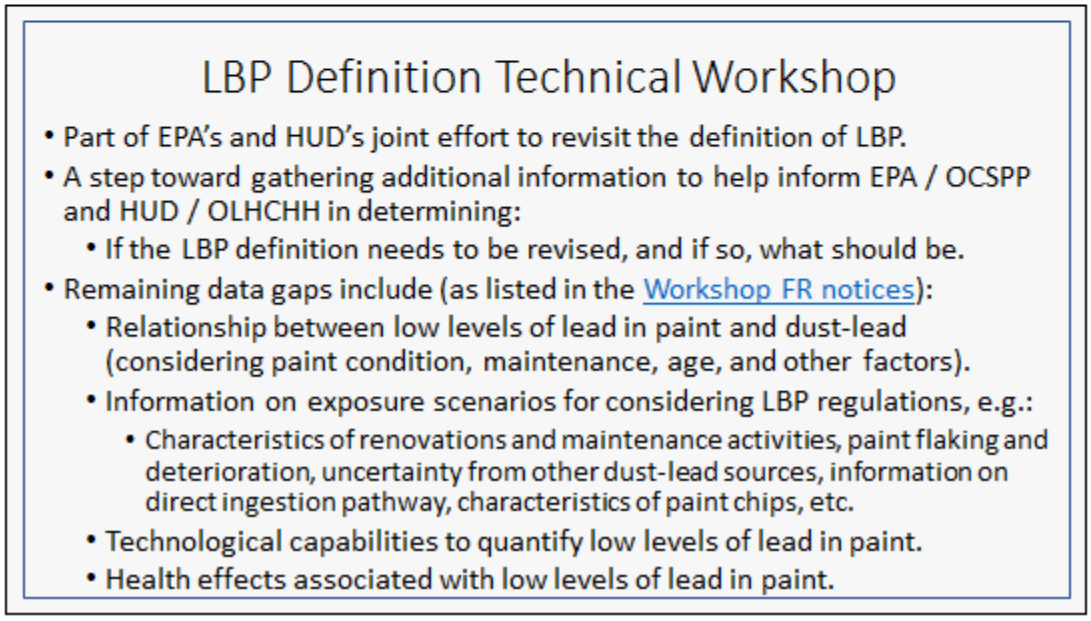




Links referenced in the slide above:

- https://www.federalregister.gov/documents/2019/07/09/2019-14024/review-of-the-dust-lead-hazard-standards-and-the-definition-of-lead-based-paint
- https://cdn.ca9.uscourts.gov/datastore/opinions/2021/05/14/19-71930.pdf
- https://www.epa.gov/system/files/documents/2022-11/Lead Strategy_1.pdf
- https://www.federalregister.gov/documents/2023/08/01/2023-15073/reconsideration-of-the-dust-lead-hazard-standards-and-dust-lead-post-abatement-clearance-levels





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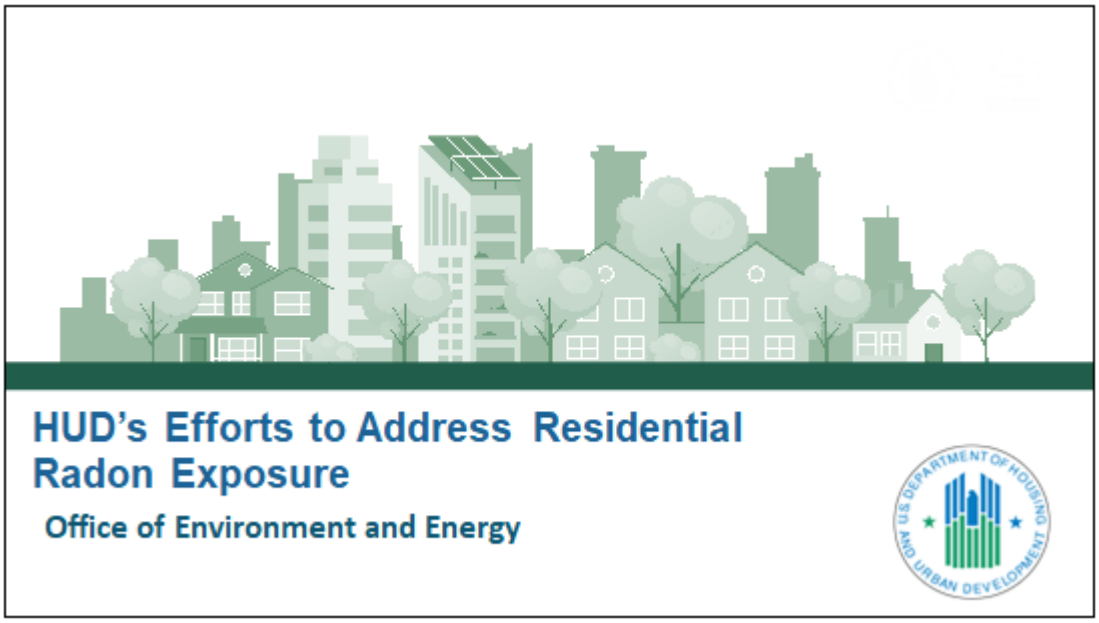
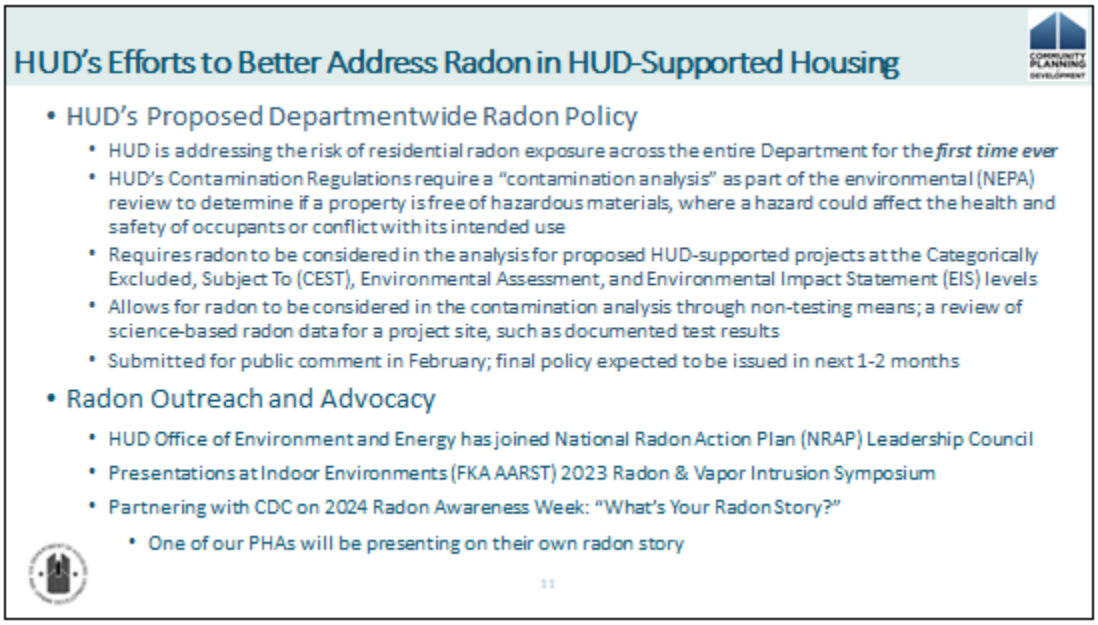
- https://www.federalregister.gov/d/2023-14682

Link referenced in the slide above:

- https://www.regulations.gov/docket/EPA-HQ-OPPT-2023-0351




HUD's Efforts to Better Address Radon in HUD-Supported Housing
• HUD's Proposed Departmentwide Radon Policy
• HUD is addressing the risk of residential radon exposure across the entire Department for the first time ever
• HUD's Contamination Regulations require a "contamination analysis" as part of the environmental (NEPA) review to determine if a property is free of hazardous materials, where a hazard could affect the health and safety of occupants or conflict with its intended use
• Requires radon to be considered in the analysis for proposed HUD-supported projects at the Categorically Excluded, Subject To (CEST), Environmental Assessment, and Environmental Impact Statement (EIS) levels
• Allows for radon to be considered in the contamination analysis through non-testing means; a review of science-based radon data for a project site, such as documented test results
• Submitted for public comment in February; final policy expected to be issued in next 1-2 months
• Radon Outreach and Advocacy
• HUD Office of Environment and Energy has joined National Radon Action Plan (NRAP) Leadership Council
• Presentations at Indoor Environments (FKA AARST) 2023 Radon & Vapor Intrusion Symposium
• Partnering with CDC on 2024 Radon Awareness Week: "What's Your Radon Story?"
• One of our PHAs will be presenting on their own radon story
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U.S. Consumer Product Safety Commission (CPSC)

Agency Point of Contact: Charles Bevington, 301-987-2009, cbevington@cpsc.gov

Note: These comments were prepared by the CPSC staff. They have not been reviewed or approved by and may not represent the views of the Commission.

This report covers background and recent updates for the following project areas:

- Nanomaterials and 3D Printing
- Portable Generator Safety
- Voluntary Standards Related to Indoor Air Quality
- Emerging Hazards and Incident Reporting
- Organohalogen Flame Retardants
- Per- and Polyfluorinated Alkyl Substances Market Use Report—Request for Information
- Carbon Monoxide Poisoning Prevention Grant Program
- New Indoor Air Quality Resources

Nanomaterials and 3D Printing (POC: Joanna Matheson, jmatheson@cpsc.gov):

Background

CPSC staff continues to work with other federal agencies and contractors to develop data on the exposure and possible toxicity of nanomaterials, focusing on developing methods that identify, characterize and quantify nanomaterials in consumer products.

Final reports from the University of Cincinnati, under contract with CPSC, are expected in late 2023 on literature reviews to fill data gaps and determine the appropriate dose metrics for *in vivo* and *in vitro* studies for nano silver, nano titanium dioxide and carbon nanotubes, as well as on emerging nanomaterials (nano alumina, nano cellulose, and graphene). Final reports also are expected for a risk evaluation of nano silver released from consumer products (emphasizing spray products) and a white paper on best practices for considerations on the evaluation of nanomaterials released from consumer products.

Rutgers University, also under contract with CPSC, is publishing results from studies assessing the resuspension of particles deposited by nano-enabled sprays onto flooring, noting the role of product type, flooring materials and resuspension force (adult vs. a simulated child) (He et al., 2022).

CPSC staff continues to work with the National Institute for Occupational Safety and Health (NIOSH), EPA and NIST on 3D printer studies.

NIOSH is continuing a multiyear project assessing toxicological responses to aerosolized emissions from 3D printers, expanding from fused deposition modeling, or FDM, printers to other commercially available printers. A recently published report demonstrates neuroendocrine effects after acute and subchronic exposures (Krajnak et al., 2023).

Work continues by NIOSH and EPA to characterize the composition and release of organic and inorganic substances, as well as factors that influence the release of emissions, with both organizations focusing

on micro- and nano-plastic particle generation and accumulation on surfaces (Peloquin et al., 2023; Wade et al., 2023).

NIST continues its project on performing a long-term (multiweek) release, accumulation and continuous-monitoring study using multiple consumer-grade 3D printers and is initiating work on characterizing the potential release of nanomaterials from 3D-printed children's toys.

With the broad federal agency interest in exposure to 3D printer material components and emissions, the National Nanotechnology Coordination Office has proposed including 3D printers in its nanoEHS strategy.

Portable Generator Safety: (POC: Janet Buyer, jbuyer@cpsc.gov)

Background

In November 2016, CPSC voted to approve a notice of proposed rulemaking to reduce the risk of CO poisoning deaths and injuries associated with portable generators. Since that time, CPSC staff has participated in voluntary standards development, completed an interagency agreement with NIST and completed an analysis on the effectiveness of two voluntary standards. All the background information can be found in the docket.

New Updates

On April 10, 2023, the Commission voted to approve a supplemental notice of proposed rulemaking (SNPR) for a Safety Standard for Portable Generators to address the CO poisoning hazard associated with portable generators. It was published in the *Federal Register* on April 20, 2023, and is also available at https://www.regulations.gov/document/CPSC-2006-0057-0118. The staff briefing package on which the SNPR is based is available at this link and starts on PDF page 99.

A 60-day comment period for submission of public comments on the SNPR closed on June 20, 2023. In FY 2024, CPSC staff will prepare and submit to the Commission a Final Rule briefing package for portable generators.

Voluntary Standards Related to Indoor Air Quality (POC: Jacqueline Campbell, jcampbell@cpsc.gov)

Background

Every year, CPSC staff is involved in several score voluntary standards activities with standards development organizations. Twice a year, CPSC publishes an update on its voluntary standards activities to its website.

A subset of the voluntary standards focuses on the relationship between certain consumer products and IAQ. Standards focus on methods for directly measuring products, emissions from products, or concentrations of chemicals in the indoor environment, as well as managing emissions from products.

New Updates

The list below provides product areas where standards development work related to IAQ is underway, should soon start, or was recently completed:

- Additive Manufacturing/3D printing
- Candles and Candle Accessories
- Carbon Monoxide (CO) Alarms
- Gas Ranges
- Nanotechnology
- Portable Generators
- Spray Polyurethane Foam (SPF) Insulation

CPSC staff also are leading an effort to develop a guide to define and categorize modeling approaches to support source characterization for indoor exposure assessment of many different kinds of consumer products. This is work item WK80812 under ASTM D22.05 (the Indoor Air subcommittee).

Emerging Hazards and Incident Reporting (POC: Treye Thomas, tthomas@cpsc.gov)

CPSC receives data reports through its National Electronic Injury Surveillance System, https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data, and Safer Products Database https://www.saferproducts.gov, as well as other data sources

These data sources and others are included on the Online Epidemiological Data Clearinghouse. This clearinghouse is available at https://www.cpsc.gov/Data.

Consumers, local government agencies, state government agencies, federal government agencies, public safety entities, health care professionals, medical examiners/coroners and child service providers can submit incident reports to the SaferProducts Database at the following link: https://www.saferproducts.gov/IncidentReporting.

Meeting participants are encouraged to share these links with their stakeholders.

Organohalogen Flame Retardants—Notice of Available Information (POC: Charles Bevington, cbevington@cpsc.gov)

Background

CPSC staff continues to work with other federal agencies and contractors to scope out and complete assessments of organohalogen flame retardant (OFR) subclasses. CPSC staff is following recommendations from the National Academies of Sciences that it adopted in its Staff Plan.

New Updates

CPSC staff is posting information to a website and companion docket. A market use report describing uses and applications of OFRs across all the subclasses was posted. Next, CPSC staff will be publishing scope documents and related supporting files.

Per- and Polyfluorinated Alkyl Substances Market Use Report—Request for Information (POC: Charles Bevington, cbevington@cpsc.gov)

Background

CPSC staff continues to coordinate and collaborate on work with other federal agencies on PFAS. CPSC staff are engaged in efforts to develop ASTM voluntary standard guides with information about how to measure PFAS in different kinds of consumer products and how to measure PFAS in indoor air.

New Updates

CPSC staff posted a contractor report in September 2023. The title of that report is "Characterizing PFAS Chemistries, Sources, Uses and Regulatory Trends in U.S. and International Markets." This report, along with several supporting files, is posted in the docket for the request for information (RFI) and is available on CPSC's website. CPSC published the RFI about this report in the *Federal Register* on September 20 (88 FR 64890). Comments were due on **November 20.** The RFI notifies the public about the availability of the contractor report and supporting files. The RFI includes questions related to available data sources that describe PFAS in consumer products, potential human exposures to PFAS in consumer products and potential adverse human health effects informed by toxicological data sources.

CPSC also recently co-chaired an ASTM workshop on PFAS in Atmosphere—Sources, Sampling and Standards.

Carbon Monoxide Poisoning Prevention Grant Program (POC: Matt Brookman, mbrookman@cpsc.gov)

Background

A grant program was authorized by the passage of the Nicholas and Zachary Burt Memorial Carbon Monoxide Poisoning Prevention Act of 2022.

New Updates

CPSC sought applications for its Carbon Monoxide Poisoning Prevention Grant Program. This program aims to prevent carbon monoxide (CO) poisoning of children and the elderly in dwelling units and other facilities by providing funding to state, local and Tribal governments that support the installation of CO alarms and training and public education programs to promote the health and public safety of citizens throughout the United States. Applications were due **December 15, 2023.**

New Indoor Air Quality Resources

CPSC 2023. Non-fire carbon monoxide deaths associated with the use of consumer products: 2019 annual estimates.

He et al., 2022. Resuspension of particles deposited by nano-enabled consumer sprays: The role of product type, flooring material, and resuspension force. *Indoor Air.* 32(11): e13157.

Krajnak et al., 2023. Inhalation of polycarbonate emissions generated during 3D printing processes affects neuroendocrine function in male rats. *Journal of Toxicology and Environmental Health, Part A.* 86(16): 575-596.

Peloquin et al., 2023. Variability in the inorganic composition of colored acrylonitrile-butadiene-styrene and polylactic acid filaments used in 3D printing. *SN Applied Sciences.* 5(10).

Wade et al., 2023. Dermal and oral exposure risks to heavy metals from 3D printing metal-fill thermoplastics. *Science of the Total Environment.* 903: 166538.

National Institute of Science and Technology (NIST)

NIST Net-Zero House

Project Contact: Lisa Ng, 301-975-4853, lisa.ng@nist.gov

The NIST Net Zero Energy Research Test Facility (NZERTF) is a two-story, four-bedroom house incorporating energy-efficient construction, space conditioning systems and appliances, as well as solar water heating and solar photovoltaics to meet the house's energy needs. For general information on the house, view the following video: http://www.youtube.com/watch?v=xSzu83fyQaQ. All publications can be found on the NIST NZERTF webpage http://www.nist.gov/el/nzertf. NIST is completing a validation project of EnergyPlus models of heat pump systems with Oak Ridge National Laboratory and New Jersey Institute of Technology.

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

In spring 2022, NIST hosted the Chemical Assessment of Surface and Air (CASA) research campaign. A team of 12 external research groups used environmental and chemical perturbations in the NZERTF to investigate the chemistry of indoor environments. Chemical transformation induced by ozone, smoke, ammonia, carbon dioxide, insecticides and VOCs were investigated. Recently two journal articles were published. The first article (https://doi.org/10.1126/sciadv.adh8263) demonstrated that at low wildfire smoke concentrations, VOCs quickly build up surface reservoirs indoors. This surface reservoir of chemicals is so large that airborne concentrations rebound to initial levels after enhanced ventilation and filtration are turned off. However, cleaning surfaces did have a long-term impact on airborne VOC concentrations. The second article (https://doi.org/10.1021/acs.est.3c04816) examined how outdoor NO_X plumes can enter indoor spaces through infiltration and mechanical ventilation and influence the indoor chemistry of the space. Specifically, the research determined the NO_X plumes entering a space can consume indoor ozone and reduce VOC oxidation. In addition, indoor ozone production during a NO_X plume infiltration event is required to produce the nitrate radical indoors. A number of other journal articles are being prepared and should be published in the next year.

ASHRAE Standard 62.1

Project Contact: Lisa Ng, 301-975-4853, lisa.ng@nist.gov

The 2022 version of Standard 62.1, *Ventilation and Acceptable Indoor Air Quality,* was published last year by ASHRAE. Among many other changes, the new version of the standard contains the following: a reorganization of Section 5, "Systems and Equipment," to better reflect the path of airflow and the relationship of buildings, systems and equipment; improvements to the performance-based IAQ Procedure; requirements for a maximum dew-point temperature in mechanically cooled buildings; clarified air density adjustments; and removal of items related to transient occupancies that now fall under Standard 62.2. The committee will be meeting during the ASHRAE Annual Conference in Chicago, January 19–21, 2024. More information is available at the following links:

- https://www.ashrae.org/conferences/2024-winter-conference-chicago
- https://tpc.ashrae.org/?cmtKey=148b7480-59ee-44a2-b2b6-881594065e04

ASHRAE Standard 62.2

Project Contact: Steven Emmerich, sjemmeri@nist.gov

The SSPC 62.2 committee will be meeting during the ASHRAE Winter Meeting in Chicago on January 19 and January 20, 2024. More information is available at the following links:

- https://www.ashrae.org/conferences/2024-winter-conference-chicago
- https://tpc.ashrae.org/?cmtKey=bc65e033-51f1-457b-9477-75f194a44f49

ASHRAE Standard 189.1

Project Contact: Andrew Persily, andyp@nist.gov

The committee responsible for the ASHRAE/ICC/IESUSGBC SSPC 189.1, *Standard for High-Performance Green Buildings Except Low-Rise Residential Buildings*, is approaching the final stages of the update to the 2020 version of the standard, which will be published in 2023. This standard constitutes the technical content of the *2021 International Green Construction Code*. The committee holds monthly web meetings, which are open to all interested parties. The committee will be meeting during the ASHRAE Annual Conference in Chicago on January 22 and January 23, 2024. More information on the 189.1 committee activities can be found on the ASHRAE website, where you can sign up for notifications of public reviews and other information: https://www.ashrae.org/resources--publications/free-resources/listserves.

ASHRAE Guideline 44P

Project Contact: Steven Emmerich, steven.emmerich@nist.gov

Proposed ASHRAE Guideline 44P *Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events* completed a first public review in the fall of 2023. The GPC 44P is now working on addressing the public review comments.

ASHRAE Guideline 45P

Project Contact: Lisa Ng, 301-975-4853, lisa.ng@nist.gov

The ASHRAE committee developing a guideline titled, “Measurement of Whole-Building Performance for Occupied Buildings Except Low-Rise Residential Buildings,” has been meeting via webinar every 3 weeks. The committee is rewriting the ASHRAE *2010 Performance Measurement Protocols for Commercial Buildings* into a guideline.

ASHRAE Guideline 241P

Project Contact: Steven Emmerich, steven.emmerich@nist.gov

ASHRAE has published Standard 241 *Control of Infectious Aerosols*. The standard establishes minimum requirements for ventilation, filtration and air-cleaning system design, installation, commissioning, operation and maintenance to reduce exposure to infectious aerosols. SSPC 241 has been established as a standing committee to maintain and revise the standard.

ASHRAE Green Guide Version VI

Project Contacts: Lisa Ng, lisa.ng@nist.gov, and Tania Ullah, tania.ullah@nist.gov

The sixth revision of the *ASHRAE Green Guide* was published earlier this year. Version VI targets more experienced building professionals, whereas the previous versions contained more introductory content. NIST took the lead editorial roles on the IEQ and Water Efficiency chapters.

CO_2 Monitoring Outreach

Project Contact: Andrew Persily, andyp@nist.gov

The use of CO_2 monitoring in schools and other buildings has increased in efforts to identify poorly ventilated spaces. In support of these and other activities, Andrew Persily published a paper, *Development and Application of an Indoor Carbon Dioxide Metric,* in the *Indoor Air* journal, available as open access (https://doi.org/10.1111/ina.13059). The paper refers to an online tool, QICO_2, that can be used to estimate a space-specific CO_2 concentration based on the target ventilation rate of the space and its occupancy, which can serve as a ventilation rate metric. That tool is available at https://pages.nist.gov/CONTAM-apps/webapps/CO2Tool/# and is described in NIST Technical Note 2213: Indoor Carbon Dioxide Metric Analysis Tool, which is available at https://nvlpubs.nist.gov/nistpubs/TechnicalNotes/NIST.TN.2213.pdf.

ASTM: D22.05 Subcommittee on Indoor Air

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

The subcommittee is starting a new effort to produce a guide (ASTM *WK81752 Guide for Determination of Airborne PFAS in the Indoor Environment*) on analytical methods for the analysis of PFAS in indoor air. The intent of the guide is to help the user understand the range of chemical properties of PFAS found in air, the applicability of various sampling media and extraction methods, and the applicability of various analytical equipment used for detection. This guide had one negative on initial ballot that is currently being resolved. The guide will be re-balloted this winter.

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

The subcommittee has started a workgroup to produce a standard test method for the testing of air cleaning technologies (ASTM *WK81750 Standard Test Method for Chemical Assessment of Air Cleaning Technologies*). This method is designed to be agnostic to the air cleaning technology, quantify the removal performance of multiple target chemicals and investigate a range of potential byproducts. NIST has conducted the experiments to support method development and provide precision and bias data for the method. This method was balloted for the first time in the summer of 2023. Several negatives are currently being addressed. The item will be re-balloted in winter 2024.

Project Contact: Andrew Persily, andyp@nist.gov

The subcommittee is revising *D6245 Standard Guide for Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation*. A revision of this standard was balloted at the subcommittee level in July 2023. The comments received during that ballot will be discussed at the D22.05 subcommittee meeting in late October, after which the standard will presumably be revised for another ballot early in 2024.

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

Other existing standards are continually undergoing review and revision on a 5-year rotation.

ISIAQ STC34

Project Contact: Steven Emmerich, steven.emmerich@nist.gov

ISIAQ Scientific and Technical Committee (STC34) aims to continuously monitor, collect and organize information about indoor environmental quality (IEQ) guidelines worldwide. In 2021, STC34 created an open integrated IEQ database that is freely accessible at www.ieqguidelines.org. Currently, the database is focused on IAQ parameters. Based on feedback and discussions, STC34 has decided to extend the database by adding outdoor air regulations and guidelines related to ventilation, comfort, acoustics and lighting.

Germicidal UV (222 nm) Ozone Formation

Project Contact: Dustin Poppendieck, 301-975-8423, dustin.popendieck@nist.gov

In room GUV using 222 nm wavelengths has recently gained traction as method to inactivate airborne pathogens. The technology directs 222 nm light onto occupied spaces to minimize the near field bioaerosol transmission. Since this wavelength creates ozone in the stratosphere, there were questions if significant ozone was formed in using this technology indoors. NIST tested a GUV 222 nm lamp in a stainless steel chamber and demonstrated the lamp did produced ozone (https://doi.org/10.1021/acs.estlett.3c00318). This research was presented at the (1) International Conference on Far-UVC Science and Technology (ICFUST) on June 14, 2023; (2) International Ultraviolet Association Achieving Consensus on Applying GUV in Public Spaces conference on June 6–8, 2023; (3) Center for Indoor Environments, Sloan Capstone Conference, October 18, 2023; and (4) the June 14, 2023, EPA CIAQ meeting (https://www.youtube.com/watch?v=md_lVq_WXOE). Dustin Poppendieck participated in the DOE LED Research and Development Discussion Meeting on Germicidal Ultraviolet (GUV) on November 26, 2023. The impacts of the ozone produced on IAQ remains a subject of future NIST studies.

U.S. Environmental Protection Agency (EPA), Indoor Environments Division (IED)

Clean Air in Buildings Challenge

The Clean Air in Buildings Challenge is a call to action by the Biden administration to encourage and assist building owners and operators with reducing risks from airborne viruses and other contaminants indoors. The Clean Air in Buildings Challenge includes a set of guiding principles and best practices that highlight a range of recommendations and available resources for improving ventilation and IAQ in buildings, which can help better protect the health of building occupants and reduce the risk of COVID-19 spread.

Key actions outlined in the Clean Air in Buildings Challenge include the following:

- Creating a clean indoor air action plan
- Optimizing fresh air ventilation
- Enhancing air filtration and cleaning
- Conducting community engagement, communication and education

White House Clean Air in Buildings Pledge Campaign

The White House has invited building owners and operators across the country to join the Administration's efforts to help fight against the spread of infectious disease (such as COVID-19) by publicly pledging to meet the Clean Air in Buildings Challenge. Visit https://www.whitehouse.gov/cleanindoorair/sign-the-pledge to take and sign the pledge!

Request for Information (RFI) for the Clean Air in Buildings Challenge

Building on the Biden administration's Clean Air in Buildings Challenge, a key component of the President's National COVID-19 Preparedness Plan, the EPA's IED issued an RFI in late 2022 that sought public comment to inform efforts by EPA and others to support the widespread adoption of actions that lead to improvements in IAQ in the nation's building stock, with a particular emphasis on commercial buildings and schools, to help reduce disease transmission indoors and improve public health. More than 400 commentors provided input. IED continues to review and consider information received during this public comment period to support the potential development, improvement and implementation of technical assistance efforts, including tools, training, guidance and other strategies to support sustained ventilation, filtration, air cleaning and other IAQ improvements in buildings. For more information, see FR Docket ID No. EPA-HQ-OAR-2022-0794.

Science

NASEM Indoor PM Consensus Study Report on Indoor Exposure to Fine Particulate Matter and Practical Mitigation Solutions

The EPA's Indoor Environments Division is sponsoring a consensus study by the NASEM Committee on Health Risks of Indoor Exposures to Fine Particulate Matter and Practical Mitigation Solutions that will review recent scientific literature on the health risks of exposure to fine particulate matter indoors and offer recommendations for engineering solutions and interventions to reduce risks of exposure to it,

including practical mitigation solutions to reduce exposure in residential settings. This study report is in the last stages of peer review and is expected to be released by the end of 2023. More information can be found on the study webpage.

New Materials Available for IED-Sponsored Why Indoor Chemistry Matters Report

EPA asked its Clean Air Act Advisory Committee (CAAAC) to prioritize the recommendations in the NASEM report *Why Indoor Chemistry Matters.* The Committee also provided a priority list for indoor contaminants of concern. The CAAAC report is available on the EPA website.

The NASEM will hold a workshop on a related topic, Why Indoor Chemistry Matters Workshop 2: Prioritizing Indoor Chemistry Research, on February 8, 2024.

The recordings of a first workshop, Indoor Chemistry and Environmental Justice: Housing, Consumer Products and Health Risks, held in September 2023, are available on the NASEM site.

EPA's Recent Science Webinars

EPA recently held two webinars on the topic of air cleaners.

- EPA's Research and Regulation of Pesticidal Air Treatment Devices webinar highlighted results from the EPA's research on the effectiveness of the technologies against infectious aerosols and discussed EPA's efforts in developing standardized test methods. Webinar speakers: Katherine Ratliff, Ph.D., and Aline Heffernan. (September 6, 2023)
- The Health Benefits vs. Disbenefits From Indoor Air Cleaners webinar provided information on the various types of air cleaners and compared the estimated reduction in mortality due to reduced airborne disease transmission (COVID-19 and flu) with the estimated increase in mortality due to the degradation of indoor air quality. Webinar speaker: Jose-Luis Jimenez, Ph.D. (August 2, 2023)

New Mold and Moisture Control Resource Summary One-Pager

A new fact sheet containing Resources for Mold Cleanup and Moisture Control (PDF) is available that summarizes resources related to mold, mold cleanup and IAQ. Simply scan the QR codes on this convenient one-pager to find information and resources related to mold, moisture control and safe mold cleanup.

IAQ Emergency Preparedness, Response and Recovery

New Emergencies and IAQ Resource Summary One-Pagers

Three new fact sheets summarize available resources related to emergencies and IAQ. Simply scan the QR codes on these convenient one-pagers to find information and resources to help you prepare for, respond to and safely recover from emergencies and their impacts to IAQ.

- Wildfires and Indoor Air Quality (PDF) [En Español]: Highlights resources for making a DIY air cleaner, creating a clean room in your home, and guidance for schools and commercial buildings during wildfire smoke events.
- Flood Cleanup and Indoor Air Quality (PDF) [En Español]: Highlights resources on how to safely clean up your home and protect your IAQ following a flood.
- Power Outages and Indoor Air Quality (PDF): Highlights resources for protecting your health and IAQ during a power outage and how to safely use a fuel-powered portable generator.

Raising Awareness of IAQ in Emergencies During National Preparedness Month

Every September, during National Preparedness Month (NPM), we are reminded to prepare for emergencies. This year, the NPM theme was preparing older adults for disasters. In September 2023, IED conducted outreach via GovDelivery mass email and social media (i.e., Twitter, Facebook, and Instagram) to raise awareness of guidance for keeping everyone, including older adults, safe during emergencies by protecting IAQ. IED highlighted strategies for safeguarding building occupants and IAQ from wildfire smoke, flooding, extreme heat and power outages. In support of these NPM outreach activities, IED also highlighted several new infographics, including the following:

- Meet Your Air Cleaning Allies (PDF): Highlights various tools and strategies for cleaning the air inside your home or building.
- How Do I Set Up a Clean Room at Home? (PDF): Highlights steps to prepare a clean room inside your home to reduce levels of smoke particles.
- DIY Air Cleaner Designs: Beyond the Basic Infographic (PDF): Highlights various DIY designs and ranks them according to how well they perform in reducing levels of smoke indoors. For more information, visit EPA's Research on DIY Air Cleaners to Reduce Wildfire Smoke Indoors webpage.

Support for Response and Recovery to Extreme Heat, Wildfire Smoke, and Hurricanes and Flooding

In June and July 2023, as the nation prepared for hurricane season and faced severe impacts from extreme heat and wildfire smoke events in many parts of the country, IED conducted outreach via GovDelivery mass email and social media (i.e., Twitter, Facebook, and Instagram) to help guide community preparation for, response to, and recovery from IAQ impacts stemming from these emergencies. Additionally, in June 2023, IED hosted a webinar in Spanish, in partnership with the Puerto Rico Chamber of Commerce, titled, "Hurricanes and Indoor Air Quality."

IED also published several interactive resources to raise awareness of how to create a clean room to reduce wildfire smoke and how to safely recover a flooded home:

- Clean Room Tour (Instagram): This video posted to EPA's Instagram in June 2023 provides a tour of a clean room and highlights how to replicate one in your home. This video complements EPA's existing guidance found in the How to Set Up a Clean Room video (YouTube) and on EPA's webpage Create a Clean Room to Protect Indoor Air Quality During a Wildfire.
- Interactive Flooded Home: Tour EPA's virtual flooded home to learn how to safely reenter and clean up your home after a flood.

New Wildfire Smoke Fact Sheets Available on the AirNow Website

Three new fact sheets that were developed to accompany Wildfire Smoke: A Guide for Public Health Officials are now available on the AirNow website:

- Coping with the Stress of Wildfire Smoke
- At-Risk Groups of People
- Using Air Quality Sensors for Smoke

New fact sheets are posted on the Wildfire Guide Factsheets webpage. For more information about the Wildfire Guide, including fact sheets and updates, visit https://www.airnow.gov/wildfire-guide-information.

EPA Grants for Wildfire Smoke Preparedness in Community Buildings

EPA published a notice of funding opportunity (NOFO) for the Wildfire Smoke Preparedness in Community Buildings program on March 22, 2023, and applications were accepted through May 9, 2023. This is a new federal grant program to support activities that will enhance community wildfire smoke preparedness and reduce indoor exposure to pollutants in wildfire smoke. States, federally recognized Tribes, public preschools, local educational agencies and nonprofit organizations are eligible for this funding for the assessment, prevention, control or abatement of wildfire smoke hazards in community buildings and related activities. The total estimated funding available for awards is $10,670,000. EPA has selected the grantees and will complete awards in 2023. For more information, visit the Wildfire Smoke Preparedness in Community Buildings Grant Program webpage.

IAQ and Tribal Communities

Tribal Indoor Air Quality Training & Resource Directory

EPA's Tribal Indoor Air Quality Training and Resource Directory is a comprehensive compilation of EPA's Tribal Indoor Air Quality Training and Resource Directory, which is a comprehensive compilation of resources and information to help Tribes identify and access various IAQ resources and funding to support the creation or expansion of Tribal IAQ programs. This resource directory, developed in collaboration with the National Tribal Air Association and the Institute for Tribal Environmental Professionals, is divided into the following sections: Healthy Homes, Schools and Buildings; Asthma; Mold and Moisture; Radon; Commercial Tobacco and Secondhand Smoke; Home Heating, Cooking and Energy; Disaster Preparedness & Mitigation; Disaster Response & Recovery; COVID-19 and Other Pathogens; Funding; Alaska Resource Addendum; and Helpful IAQ Contacts.

Visit Indoor Air Quality in Tribal Communities to learn more and to download the Resource Directory.

Household Energy (Cooking, Heating and Lighting in Low- to Middle-Income Countries)

Leadership on Cookstoves/Household Energy

Over the past 3 years, EPA has continued to lead an effort to broaden and strengthen a whole-of-government approach to addressing the global issue of 3.2 million deaths annually from exposure to polluting emissions from cookstoves and fuels. If you or your organization are interested in joining the USG Household Energy Interagency Working Group, please reach out to John Mitchell at mitchell.john@epa.gov.

Advancing Sustainable Household Energy Solutions (ASHES) Initiative at Colorado State University

EPA cooperative partner Colorado State University is collaborating with the Berkeley Air Monitoring Group to implement a household energy solutions and air quality initiative called Advancing Sustainable Household Energy Solutions (ASHES). This work includes a webinar series that shares the latest household energy findings from numerous researchers and their organizations. ASHES webinars have highlighted the work of the World Health Organization's household energy initiatives, EPA Science to Achieve Results (STAR) grantees, the World Bank and other research programs. The latest ASHES webinar, which was held on October 11, 2023, focused on Energy Transitions to and from Gas Cooking: A Global Perspective. For more information on ASHES, or to watch recordings of previous ASHES webinars, please go to www.ashes-csu.org.

Working With Countries to Implement Their Nationally Determined Contributions (NDCs)

To date, 98 countries have included references to reducing emissions from household energy in their Nationally Determined Contributions to the Paris Climate Agreement. EPA is working with partners in the Clean Cooking & Climate Consortium (4C)—which includes the Clean Cooking Alliance, Climate and Clean Air Coalition (CCAC), Berkeley Air Monitoring Group, Stockholm Environment Institute and the United Nations Framework Convention on Climate Change (UNFCCC)—to support countries in meeting their climate goals through clean cooking initiatives. 4C has been hosting a series of expert consultations to facilitate more direct interaction and support to countries in the development of household energy components in their NDCs; organizing their measurement, reporting, and verification (MRV) activities; financing opportunities; and best practices for scaling clean cooking programs to meet their national climate goal. Most recently, 4C has been working closely with stakeholders on an initiative to drive integrity, credibility and trust in the cooking and carbon markets by developing a new methodology in line with the latest science for crediting emissions reductions from cookstove projects.

State of the Evidence Base Paper

EPA and its partners are developing a State of the Evidence Base paper for the clean cooking sector, covering research on health, climate, gender, economics and more. This paper, which is targeted to be completed in 2024, will collect existing knowledge about household energy, identify gaps in research and help actors set priorities for future efforts in this sector.

Notice of Funding Opportunity (NOFO): Cleaner Cooking and Reducing Household Energy Emissions

In February 2023, EPA announced a funding opportunity to provide approximately $1 million annually in support to improve climate, environment, health, gender equity and livelihoods by reducing emissions from household energy in low- to middle-income countries. After a competitive process, this funding was awarded to the Clean Cooking Alliance (CCA), an organization with a long-standing track record of successful collaboration with EPA to advance clean cooking priorities on a global scale. EPA and CCA plan to continue their work supporting country governments in elaborating national clean cooking priorities and strengthening the capacity of cookstove testing labs to test to the ISO standard, ensuring the effectiveness and safety of stoves promoted around the world.

Radon

National Radon Action Plan (NRAP)

IED continues to support the growing national network of federal agencies, private-sector and nongovernmental organizations (NGOs), and states to prevent lung cancer deaths through the NRAP. The NRAP presents a long-range strategy for eliminating avoidable radon-induced lung cancer in the United States. The NRAP Leadership Council invites leaders who are serious about saving lives; building in health protection where we live, work and learn; eliminating preventable disease; and realizing a high return on investment in a healthier future to join the NRAP Leadership Council.

Leadership Council members meet monthly to share updates and progress toward the goals outlined in the NRAP. Twice a year, the NRAP holds a longer and more in-depth meeting with all members to evaluate the collective impact of our work and identify continued actions needed to reinforce priority strategies and activities. The Leadership Council met in person on June 22, 2023, in Washington, D.C., and is scheduled to conduct its next assessment meeting in January 2024.

State and Tribal Indoor Radon Grants (SIRG)

EPA continues to support programs aimed at risk reduction through the State and Tribal Indoor Radon Grant (SIRG) Program. The SIRG Program was appropriated $10.9 million in FY 2023 for state and Tribal indoor radon grants, an increase of $2.7 million over the previous year. This is the first significant increase in annual SIRG appropriations since the program's inception in the late 1980s. In alignment with EPA's current strategic plan, EPA plans to increase funding not only to states, but also to existing and new Tribal grantees, and is also encouraging state grantees to assist underserved and low-income communities. The EPA Regions are in the process of awarding SIRG funds, and we anticipate multiple new state and Tribal grantees this year.

In spring 2024, EPA will release a new Annual SIRG Activities Report, highlighting important work states, territories and Tribes are undertaking across the country to advance risk reduction. We encourage everyone to view the upcoming and previous reports on the EPA's SIRG Resources webpage.

Building Codes and Standards

EPA continues to collaborate with industry and states to actively engage in efforts to promote adoption of radon-resistant new construction (RRNC) practices through international, national, state and local building codes. These efforts are mandated by the Indoor Radon Abatement Act and are also a key component of the NRAP. Model codes and standards for radon resistant new construction (RRNC) exist in single-family, multifamily and large buildings through ANSI/AARST Voluntary Consensus Standards, IED programs and green standards for single-family buildings. This includes such programs as EPA's Indoor airPLUS, NAHB 700 and ASHRAE 189.

The International Residential Code (IRC) is the most widely used national building code for residential new construction in the United States that comes from the International Code Council's (ICC) family of national building codes. Appendix F in the IRC was adopted in 1995 to provide RRNC optional requirements if someone were to build a home radon resistant. An important opportunity for code improvement for Appendix F and the rest of the IRC will happen in 2025, when EPA will attempt to bring RRNC and testing requirements for radon into the main body of the code.

Radon Credentialing

EPA's work on radon credentialing is part of the Agency's responsibility to promote and support the availability of quality radon services to the public. Professionals who provide radon testing and mitigation services play a key role in public health protection efforts. In March 2023, EPA released Proposed Radon Credentialing Criteria to help align and encourage consistency across radon credentialing programs. The nonregulatory criteria are designed to provide a national quality standard for state-run and independent programs that credential radon service providers. The public comment period closed on June 21, 2023, and EPA is currently analyzing feedback received through the *Federal Register*, which will inform the final criteria. For more information about EPA's proposed criteria and to access materials from an April information session, visit the EPA radon website at https://www.epa.gov/radon/epas-draft-criteria-radon-credentialing-organizations.

EPA's Radon Reference and Intercomparison Program (ERRIP)

As part of annual requirements for secondary radon chambers to be certified to perform radon measurements and calibrations services for the radon industry participating in the National Radon Safety Board (NRSB), American Association of Radon Scientists and Technologist's National Radon Proficiency Program (AARST-NRPP), and state radon programs, secondary radon chambers participate in EPA's Radon Reference and Intercomparison Program (ERRIP), managed and operated by the EPA's Office of Radiation and Indoor Air, National Analytical Radiation Environmental Laboratory (NAREL), located in Montgomery, Alabama. NAREL provides the only U.S. radon reference that is NIST-traceable. There are currently four industry certified secondary radon chambers for use by the U.S. radon community: Bowser-Morner, Inc., Dayton, Ohio; TCS Industries, Inc., Harrisburg, Pennsylvania; KSU Radon Chamber, Manhattan, Kansas; and Spruce Environmental Technologies, Ward Hill, Massachusetts.

Asthma

National Environmental Leadership Award in Asthma Management

The 2024 competition for the EPA's National Environmental Leadership Award in Asthma Management launches in November. This is the only national award for excellence in comprehensive asthma management with a focus on environmental interventions for asthma triggers. Eligible organizations are addressing asthma disparities in their community and have an integrated approach featuring partnerships between public health, housing, health care and community organizations. The application will be available on EPA's Asthma website and applications will be accepted until early February 2024.

Asthma Community of Practice

On October 25, 2023, EPA hosted a webinar entitled, "Solving for the Indoor Environmental Determinants of Health (IEDOH) in Asthma: Using Data to Prioritize In-Home IEDOH Interventions." This webinar was the first in a series of three webinars that will showcase solutions to help communities address and reduce indoor environmental risks to improve asthma health outcomes and disparities. Experts from Harvard University, UCLA, the St. Louis County Department of Public Health, and the Red Hook Initiative explored asthma and environmental data collection and analysis from three different perspectives and potential opportunities to use data to prioritize in-home environmental interventions and improve indoor environments for people with asthma. The webinar recording will be available in the coming months at AsthmaCommunityNetwork.org.

Federal Collaboration on Asthma Disparities

EPA staff continue to participate in the monthly Asthma Disparities Subcommittee of the President's Task Force (PTF) on Environmental Health and Safety Risks to Children. The task force includes 17 federal agencies and is the focal point for federal government agencies to coordinate for the betterment of children's environmental health. The monthly meetings feature reporting from PTF-supporting subcommittees that address three priority areas: (1) climate, emergencies and disasters; (2) asthma disparities; and (3) lead exposures.

EPA staff also participate in the monthly Asthma Disparities Workgroup (ADWG) Leadership Meetings. The ADWG is an extension of the Federal Asthma Disparities Action Plan and is co-chaired by EPA, the U.S. Department of Health and Human Services and HUD. The ADWG full subcommittee comprises more than 60 federal stakeholders who are committed to coordinating activities and leveraging resources to address nationwide disparities in asthma health outcomes. The goal of the ADWG is to help close the gap in inequities in comprehensive asthma care. During the meetings, members discuss strategies to advance the three major priority areas of the Asthma Disparities Subcommittee, which are focused on expanding sustainable financing for in-home asthma interventions, closing research gaps, and creating equitable expectations for asthma outcomes for all patients and caregivers.

On October 30, 2023, EPA—in collaboration with CDC, HUD and the National Institutes of Health (NIH)—hosted the Asthma Disparities Workgroup (ADWG) Full Subcommittee meeting. Discussion topics for this meeting included ADWG priority areas of sustainable financing (EPA), research gaps (CDC) and expectations/equitable outcomes (NIH National Heart, Lung, and Blood Institute [NHLBI]). The discussion also included updates on the President's Task Force on Environmental Health Risks and Safety Risks to Children (PTFCEH) (NHLBI) and the Asthma Control in Tribal Communities Initiative (IHS).

Technical Assistance and Resources

An important component of EPA's asthma program is capacity building and equipping stakeholders with ongoing technical knowledge. This is accomplished through AsthmaCommunityNetwork.org, an online resource that facilitates peer-to-peer engagement and action learning events. Currently, more than 5,000 members are registered. EPA hosts technical webinars throughout the year, and the webinars are archived on the website. In addition, AsthmaCommunityNetwork.org features more than 600 asthma educational materials in the Resource Bank and offers mentoring opportunities for registered members. You can also find more information on our asthma award winners and sustainable financing. If you are not a member, join today!

The Asthma Publications Resource One-Pager has QR codes to several asthma resources, including guides for asthma triggers, tips for controlling asthma and a home visit checklist for health care professionals. Learn how good IAQ contributes to a favorable environment for individuals with asthma. Simply scan the QR codes to access the resources**.** (See the Asthma Resources One-Pager PDF.)

Comprehensive IAQ Interventions in Homes

Indoor airPLUS: Leader Award Winners

IED announced the winners of the 2023 Indoor airPLUS Leader Awards. The awards recognized 14 homebuilder and rater partners who construct and verify Indoor airPLUS homes, which are designed and built for improved IAQ. This annual leadership award recognizes market-leading Indoor airPLUS

homebuilder and rater partners. Winners have demonstrated exemplary approaches to promote safer, healthier and more comfortable indoor environments by offering enhanced IAQ protections and long-term value for new homebuyers with the Indoor airPLUS label. The winners were formally recognized on October 11, 2023, at the Energy and Environmental Building Alliance (EEBA) High Performance Home Summit. During this event, EPA also announce the Indoor airPLUS Leaders of the Year—awarded to just one builder and one rater—for outstanding program participation and promotion. Visit the EPA website for a list of all the 2023 award winners.

Indoor airPLUS: New Homes

IED's Indoor airPLUS program is a voluntary partnership and labeling program that helps new home builders address customer health concerns through construction practices and product specifications that minimize exposure to airborne pollutants and contaminants. The program continues to see sustained growth, with approximately 70,000 total Indoor airPLUS–labeled homes reported at the end of the FY 2023.

Indoor airPLUS: Program Updates

In February 2023, EPA proposed updates to the Indoor airPLUS program, including a two-tiered certification program and other changes to strengthen and update program specifications and requirements. The comment period on the proposed updates closed on April 24, 2023. This 2023 proposal is designed to address feedback received on a previous 2020 proposal and to encourage broad industry participation to advance IAQ protections while strengthening program integrity with an improved verification and quality assurance framework.

Under this proposed program update (Version 2), builders will have an opportunity to choose between two Indoor airPLUS labels: Indoor airPLUS and Indoor airPLUS Gold. The proposed "Indoor airPLUS" specifications focus on strategies to improve IAQ without a prerequisite of ENERGY STAR certification. The proposed "Indoor airPLUS Gold" specifications include more advanced protections for improved IAQ in conjunction with ENERGY STAR certification.

Following the comment period that closed on April 24, 2023, EPA is processing feedback received to inform the path forward. EPA expects to release the final Indoor airPLUS and Indoor airPLUS Gold specifications in early 2024. During the initial phase of implementation, partners may continue to use Indoor airPLUS Construction Specifications Version 1, Rev.4, or begin to use one of the new two-tier specifications. EPA anticipates that the Indoor airPLUS Version 1 Construction Specifications will be sunset during 2025. These dates are subject to change.

Comprehensive IAQ Interventions in Schools

Inflation Reduction Act—Schools Air Quality Grants

Provision 60106 of the Inflation Reduction Act includes a new $50 million program to improve school air quality and reduce greenhouse gas emissions, with a particular focus on schools serving low-income, disadvantaged and Tribal communities. This program will include funding for grants and other activities to monitor and reduce air pollution and greenhouse gas emissions at schools, as well as technical assistance to schools in low-income and disadvantaged communities to address environmental issues; develop school IAQ plans that include standards for school building, design, construction, renovation, and maintenance; and identify and mitigate ongoing air pollution hazards.

EPA recently completed a 6-month outreach effort to solicit feedback from the public, nonprofits, industry, Tribes and across the federal government on how to make the best use of the IAQ school funding provided by the IRA. The feedback provided by more than 500 individuals and organizations has heavily influenced the design of the IAQ grant program and technical assistance activities.

In December 2023, EPA plans to post a NOFO on https://www.grants.gov. Once the notice is posted, states, Tribes, territories, local governments/educational agencies and nongovernmental organizations will have approximately 90 days to submit applications for grant funding to address indoor air pollution in low-income, disadvantaged, and Tribal K–12 schools.

EPA Engagements and Webinars on Schools

EPA continues to support healthy indoor environments in schools, including after the COVID-19 public health emergency, which ended in May. View IED-hosted webinars in the series, Healthy Indoor Environments in Schools: Plans, Practices and Principles for Maintaining Healthy Learning Environments.

EPA continues to actively deliver technical assistance to the schools' community through two professional training webinar series: IAQ Master Class Professional Training Webinar Series and IAQ Knowledge-to-Action Professional Training Webinar Series. Since 2015, both series have had more than 22,000 views from live webinars and on-demand recordings online. EPA is eager to drive even more action in school districts through spreading the IAQ Master Class Professional Training Webinar Series across more networks and platforms. Contact us at iaqschools@epa.gov if your organization would like to use your existing training platforms and vehicles to host or link to the webinar series.

Collaboration With Federal Partners to Promote School Environmental Health

EPA and the U.S. Department of Education are working to sustain and expand a collaborative partnership on healthy infrastructure, IAQ investments, and health and learning in schools. This collaboration is prioritizing good IAQ in schools as essential for achieving learning outcomes, health and wellbeing and has a special focus on schools serving low-income communities.

EPA continues to collaborate with the DOE's Efficient and Healthy Schools campaign. The campaign aims to help K–12 schools—especially those serving low-income student populations—identify practical HVAC solutions and upgrades to improve energy efficiency while promoting healthier spaces for teaching and learning. This campaign will promote peer-to-peer learning among school participants and will recognize schools for their best practices and exemplary solutions. The campaign will also engage supporters—such as designers, engineers, consultants and program implementers—to better support schools that are investing in efficient and healthy school buildings.

Expanding the Reach for School IAQ Training

Resources for Healthy IAQ in Schools One-Pager: This one-pager has QR codes to several IAQ in schools resources, including guides for parents, teachers, school administrators and school maintenance professionals. Learn how good IAQ contributes to a favorable environment for students, improved teacher and staff performance, and a sense of comfort, health and well-being. In combination, these elements empower schools in meeting their core mission—educating children. Simply scan the QR codes to access the resources. (See the Resources for Healthy Indoor Air Quality in Schools PDF).

EPA also continues to promote the *Indoor Air Quality Tools for Schools:* Preventive Maintenance Guidance Documents to help school personnel take a holistic, proactive approach to IAQ issues. The

guidance leads school personnel through the steps to develop and implement an IAQ preventive maintenance plan and offers a framework to make the case using a value proposition for an IAQ preventive maintenance plan and gain buy-in from the school community.

Secondhand Smoke/Aerosols and Smoke-Free Homes

Secondhand Smoke and Radon Highlighted in White House Cancer Moonshot Initiative

In September 2023, as part of the Biden Administration's Cancer Moonshot℠ Initiative, EPA launched a new website, EPA Efforts to Reduce Exposure to Carcinogens and Prevent Cancer at www.epa.gov/cancer. The website highlights Agency activities that focus on cancer risk and prevention and includes new information and prominently featured resources from EPA about radon and secondhand smoke, which have recently been updated to include smoking cessation resources from federal agencies and other credible sources.

Secondhand Smoke/Aerosols and Smokefree Guidance Updated With Smoking Cessation and Thirdhand Smoke

In 2023, EPA expanded the web-based consumer guidance on secondhand tobacco smoke, secondhand electronic-cigarette aerosols, secondhand cannabis smoke and smokefree indoor environments, and the guidance has been updated to introduce smoking cessation co-messaging and resources. In addition, the update includes introductory language on thirdhand smoke exposure, a topic for which EPA has recently seen an increase in inquiries. People experience thirdhand exposure when they touch contaminated surfaces or breathe the air where smoking chemicals are released from surfaces back into the air. View the updated web content here: https://www.epa.gov/indoor-air-quality-iaq/secondhand-smoke-and-smoke-free-homes.

COVID-19

Important information on COVID-19 and indoor air is posted on EPA's COVID-19 website at https://www.epa.gov/coronavirus. Specific indoor air COVID-19 content can be found within this site by going directly to https://www.epa.gov/coronavirus/indoor-air-and-coronavirus-covid-19.

For multilingual web content on COVID-19 and IAQ, as well as other indoor air environmental health issues, visit https://www.epa.gov/lep.

Consider Subscribing to Email Alerts on IAQ Topics

EPA offers a free subscription service for information on more than 20 indoor air topics—opt in at https://public.govdelivery.com/accounts/usepaiaq/subscriber/new to receive email updates on IAQ. More than 200,000 subscribers regularly receive announcements of upcoming trainings, webinars and events, as well as practical tips and information resources to improve IAQ. Subscribers can choose from among 20 topics, such as mold, air cleaners, radon, environmental asthma, air quality in schools, and IAQ emergency preparedness and response. Many topics are also presented in Spanish. Subscriptions can be canceled easily at any time.

Indoor Air 2024

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