



## LESSONS LEARNED: Environmental Services

### OBSERVATIONS & LESSONS FROM THE SCHOOL OF EXPERIENCE

#### WHAT IS THAT SMELL?

Do you like the “new car” smell experienced when you drive a car off the dealer’s lot? Or how about the smell of new carpet and fresh paint when you walk into a building? Do you know what produces those smells? If you did, you might want to think twice taking another deep breath. The air might come with a side-order of formaldehyde, airborne particulates, volatile organic compounds (VOCs), 4-phenylcyclohexene, and carbon monoxide. Even without an advanced degree in chemistry, if you watch the television or listen to the radio, you probably recognize a few of these words for what they are: a hazard to your health.

#### Getting to Know Your Contaminants

- **Formaldehyde:** Many building materials including glues, adhesives, carpets, and composite wood furnishings, contain formaldehyde. Side effects of formaldehyde exposure include eye, nose, and throat irritation, nausea, headache, allergic-sensitization, and exacerbation of asthma.
- **Airborne Particulates:** Some common construction materials such as fiberglass insulation, gypsum, soil, and construction debris contain dust, or airborne particulates.
- **VOCs:** Other building materials, such as acetone, methylene chloride, toluene, and styrene contain VOCs, in which the carbon evaporates (becomes a vapor) at room temperature. VOC’s contain carcinogens, which are known to cause cancer.
- **4-Phenylcyclohexene:** “New carpet smell” is actually 4-Phenylcyclohexene, which is emitted from the styrene butadiene rubber binder used to hold the carpet fibers to the backing. At the least, 4-Phenylcyclohexene can be an irritant, although its toxicology has not been fully established.
- **Carbon Monoxide:** Carbon monoxide is a colorless, odorless, and tasteless gas emitted as the product of incomplete combustion. Carbon monoxide causes fatigue, disorientation, and chest pains, and in higher concentrations, it causes death. Because it is completely undetected by the human senses, and its victim can fall into a deadly sleep, carbon monoxide is known as the “silent killer.” Carbon monoxide can linger after the use of space heaters during construction, or improperly vented furnaces or hot water heaters.

All of these contaminants, as well as molds, bacteria, and other indoor pollutants can contribute to occupant discomfort or illness often referred to as “sick building syndrome.”

#### Keep It Under The Limit

The U.S. Green Building Council’s, New Construction and Major Renovation Reference Guide, requires contaminant levels to be below maximum thresholds prior to occupancy for Leadership in Energy and Environmental Design (LEED®) Certification.

#### Maximum Thresholds for LEED® Certification

Contaminant	Maximum Concentration
Formaldehyde	50 parts per billion <sup>1</sup>
Particulates (PM10)	50 micrograms per cubic meter
Total Volatile Organic Compounds (TVOC)	500 micrograms per cubic meter
4-Phenylcyclohexene (4-PCH)	6.5 micrograms per cubic meter
Carbon Monoxide (CO)	9 parts per million and no greater than 2 parts per million above outdoor levels

Source: *New Construction and Major Renovation Reference Guide*

#### What Can I Do to Reduce Contaminants?

- Reduce the contaminants in your building by working with a LEED® accredited architect to incorporate low contaminant emitting interior finishing materials such as adhesives, sealants, paints, coatings, carpeting, composite wood, and agrifiber products into your projects.
- Flush out the spaces with fresh air prior to occupancy.
- Ask your LEED® accredited architect and mechanical engineer for ideas to change the design and construction of your next building to make the air inside safer to breathe.
- Develop an Indoor Air Quality Management Plan (IAQ) during design and execute the plan during construction before you hand over the keys.

Even if your project will not become LEED® certified, it still makes business sense to make it a safe and comfortable place to breathe!

#### For Further Information...

Please contact the ECS office nearest you for assistance with LEED® IAQ Management Plans or any other IAQ concerns or testing services. ECS is a member of the U.S. Green Building Council.

Respectfully,

**ECS Corporate Services, LLC**

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<sup>1</sup> LEED® 2009, balloted at the time of publishing, will reduce the maximum concentration for formaldehyde to 27 ppb.