

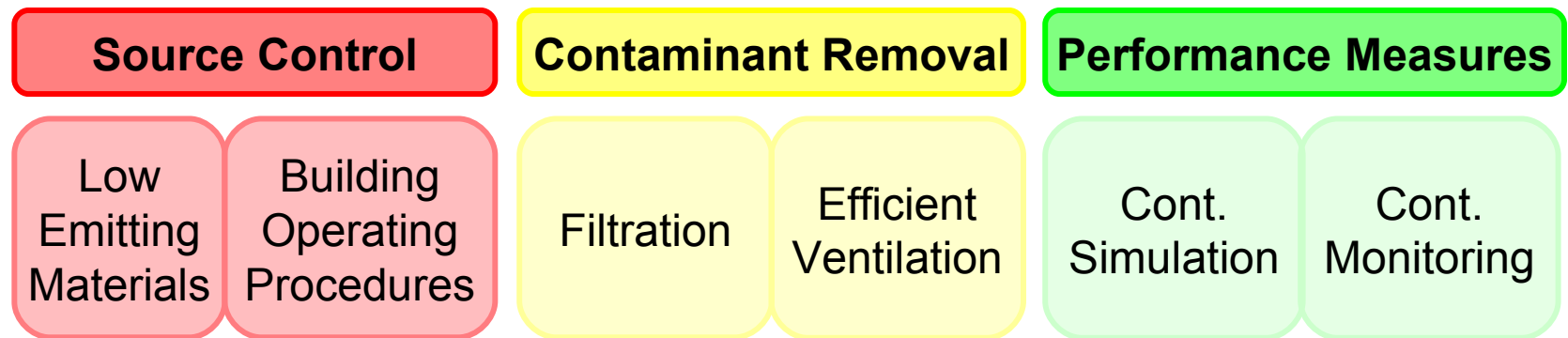
Determining Contaminants of Concern When Implementing ASHRAE Standard 62.1 Indoor Air Quality Procedure

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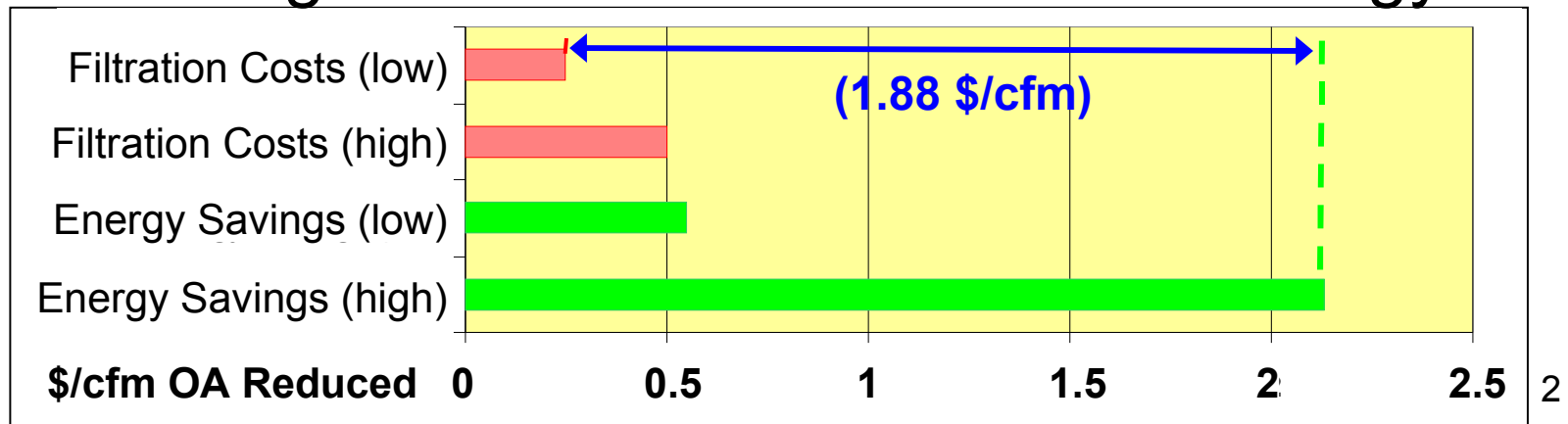


Why Use the IAQP?

- IAQ Procedure = Contaminant Based Design



- Controlling Contaminants = ↓ OA = ↓ Energy



(Fisk, 2007)

Contaminants of Concern (CoC)

- Existing Resources for Choosing
 - ASHRAE 62.1 Appendix B: Summary of Selected Air Quality Guidelines
 - Research Building Studies
 - Perform Chemical Air Sampling
- Which Contaminants are still UNCLEAR
- Broad use of the IAQP Needs lists of Typical CoC
 - building type → typical contaminants
- This Work Compares
 - CoC from Published IAQP Applications
 - A Building Data Review Ranking Indoor VOCs

IAQP Publications

Pub #	Building Type	Success Basis
1	Office Building	Contaminant Simulation
2	School Auditorium	Air Sampling & Complaint Log
3	High School Classrooms	Air Sampling & Complaint Log

1 – (Stanley, 2002)

2 – (Johnson, 2006)

3 – (Lamping, 2008)

Building Data Review

Building Type	Studies	Ranking
• Offices • Residences	• 1990 - 2003 • Multiple VOC studies • EPA BASE	• Hazard Quotient Methodology • Odor • Sensory Irritation • Noncancer Chronic Toxicity

(Hodgson, 2003)

Building Data Review CoC

Office Building (OB) HQ > 0.1

1,4 dichlorobenzene
benzene
hexanal
naphthalene
nonanal
tetrachloroethene



Residence HQ > 0.1, not monitored in OB

3-methylbutanal
acetaldehyde
acetic acid
formaldehyde
heptanal
naphthalene
nonanal
Tetrachloroethene



OB - All Combined

1,4 dichlorobenzene
3-methylbutanal
acetaldehyde
acetic acid
benzene
formaldehyde
heptanal
hexanal
hexanoic acid
naphthalene
nonanal
octanal
propionaldehyde
tetrachloroethene

Contaminant Comparison

IAQ Procedure Applications			Building Data Review
Publication 1 <i>Office Building</i>	Publication 2 <i>School Auditorium</i>	Publication 3 <i>High School Classrooms</i>	<i>Office Building</i>
<i>VOCs</i> acetone formaldehyde methyl alcohol TVOC	<i>VOCs</i> none	<i>VOCs</i> acetone formaldehyde methyl alcohol phenol TVOC	<i>VOCs</i> 1,4 dichlorobenzene 3-methylbutanal acetaldehyde acetic acid benzene formaldehyde heptanal hexanal hexanoic acid naphthalene nonanal octanal propionaldehyde tetrachloroethene
<i>Other</i> none	<i>Other</i> CO ₂	<i>Other</i> CO	
<i>Inorganics</i> NO ₂ O ₃ SO ₂	<i>Inorganics</i> NH ₃	<i>Inorganics</i> NH ₃ H ₂ S NO ₂ O ₃ SO ₂	

US EPA
Criteria
Cont.

Typical CoC Proposal

- Office Building - Gases
- Indoor VOCs
 - VOCs ranked significant by hazard quotient method
 - VOCs present in >1 published IAQP applications
- Inorganic Compounds (mainly outdoor)
 - US EPA Criteria Contaminants
 - Inorganics present in > 1 published IAQP applications

Typical CoC List

- Office Building - Gases

VOCs		Inorganics
1,4 dichlorobenzene	hexanal	ammonia
3-methylbutanal	hexanoic acid	carbon monoxide
acetaldehyde	naphthalene	nitrogen dioxide
acetic acid	nonanal	ozone
benzene	octanal	sulfur dioxide
formaldehyde	propionaldehyde	
heptanal	tetrachloroethene	

Conclusions

- The IAQP can impact energy consumption positively
- Broad use of the IAQP requires a CoC typical list for typical building types
- This presentation proposes a typical list for office buildings
- Further collaboration on such typical CoC lists is needed

References

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