



## Recommendations

Install ventilation with filter units to effectively reduce dust concentrations.

When swine barn heaters need to be periodically replaced, consider switching traditional models with newer models that are made from stainless steel (to increase longevity), have a fresh air intake, and vent combustion gases outside.

Only new heater models should be considered when constructing new swine facilities.

Ventilation systems and new vented heaters should be used simultaneously in order to provide the greatest amount of protection.

## Questions?

If you would like to learn more about protecting worker and swine health, please contact Renée Anthony.

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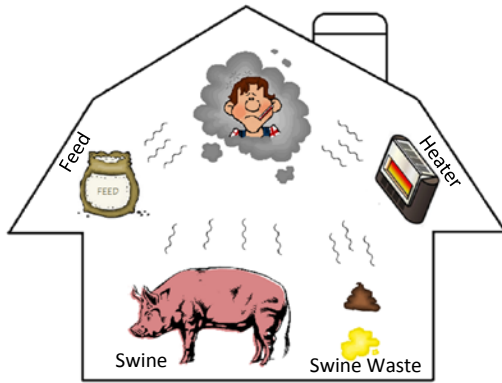
Email: [renee-anthony@uiowa.edu](mailto:renee-anthony@uiowa.edu)

Web: <http://www.public-health.uiowa.edu/gpcah/center-projects/intervention-to-reduce-exposures-in-cafos/>



# IMPROVING SWINE BARN AIR QUALITY

*Methods to protect workers  
and swine*



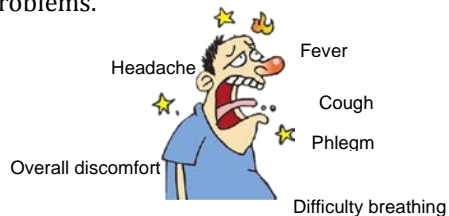
## Background

Harmful substances are found in swine barns that affect human and swine health:

- Dust: Respirable dust (particles smaller than  $10\ \mu\text{m}$ )
- CO: Carbon monoxide
- CO<sub>2</sub>: Carbon dioxide

Contaminant levels are especially high during the winter months when windows and doors are kept closed for warmth.

Working in swine barns can lead to health problems.



Working in swine barns over a long period of time can lead to more serious conditions.

Pig health is also affected by swine barn contaminants.

- Decreased growth rate
- Decreased litter size
- Lower survival rate

## Dust Control

Sources: Feed, swine, swine waste  
Measuring Methods:



pDR-1200  
Dust

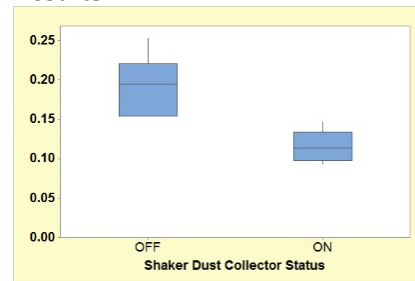


SKC Sampling  
Pump

Respirable dust concentrations should be below  $0.23\ \text{mg}/\text{m}^3$ .

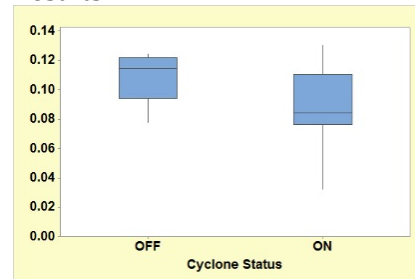
### Shaker Dust Collector (2013)

Results:



### Cyclone (2014)

Results:



Both Shaker Dust Collector and Cyclone were effective in reducing dust concentrations. The Shaker Dust Collector was better. For added worker protection, respirator use should be considered.



## Gas Control



Unvented  
Heater (2013)



Vented Heater  
(2014)

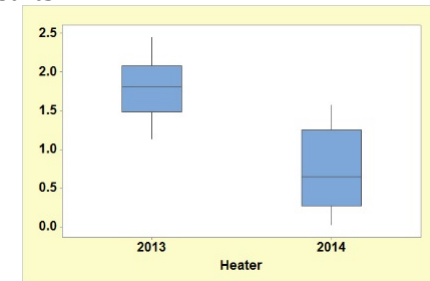
### CO

Sources: Heater

Measuring Method:

VRAE Multi Gas Monitor

Results:



The new vented heater significantly reduced CO concentrations compared to the unvented heater. Both years were below the 25 ppm limit.

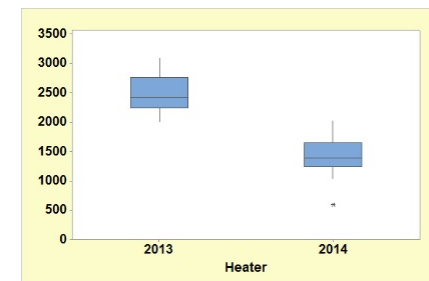
### CO<sub>2</sub>

Sources: Heater, swine

Measuring Method:

ToxiRAE CO<sub>2</sub> Monitor

Results:



The new vented heater significantly reduced room concentrations of CO<sub>2</sub> compared to the unvented heater. In 2013, every day exceeded the 1540 ppm limit. In 2014, only 25% of days exceeded this limit. The vented heater reduced room CO<sub>2</sub> concentrations by 800 ppm.