

# **Continuous IA VOC Monitoring: Ramifications on Soil Gas & IA Sampling & the TCE Short-Term Issue**

**EMDQ Workshop - Portland**

**April 2015**

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**HARTMAN**  
ENVIRONMENTAL GEOSCIENCE

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# Presentation Summary

- What's the Motive for These Data?
- System Description
- Ramifications on IA & SS Sampling
- Case History - Results from a Print Shop
- Long Term Stewardship Costs

# The **HOT** VI Regulatory Topics (as of 1/2015)

## Red Hot

1. Short Term TCE Exposure
2. Hydrocarbon Sites
3. New EPA VI Guidances



## Semi-Red Hot

1. New ASTM Phase I Standard
2. What's Going On With the States

# New EPA TCE Guidelines (As of July 2014)

- Short Term TCE Exposure (Fetal Malformation)
  - Residential: 2 ug/m<sup>3</sup>
  - Commercial: 7 - 8 ug/m<sup>3</sup>
- Prompt Response (within 30 days!)
- Exposure Period Unclear: 21 days? 24 hours?

*Covers Pregnant & Potentially Pregnant Employees!!*

*How Often & Long to Monitor IA For?*

# Continuous Monitoring Devices



GC-ECD



Not Stable

Expensive (\$125K)

Hapsite GC/MS



Non-Selective

~\$25K

Frog4000 GC/PID



CHF Collections. Courtesy of James E. Lovelock. Photo by Gregory Tobias

g+1 0

## Electron Capture Detector

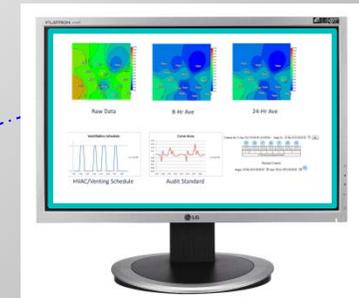
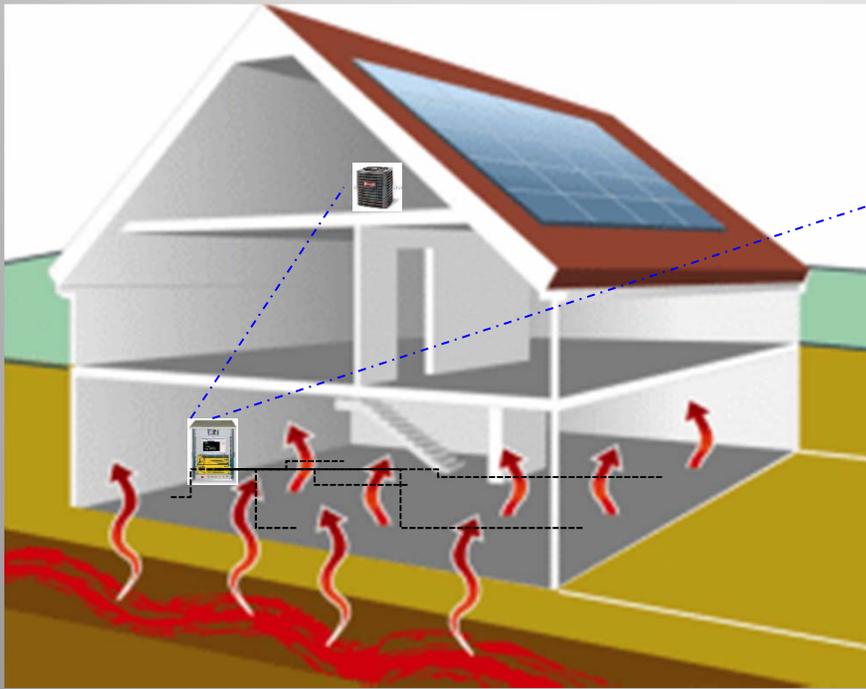
James E. Lovelock, 1958

# System Capability

- **Fully Quantitative!**
- Can Reach Ultra-Low Levels (<1 ug/m<sup>3</sup>) for Subset of Compounds
- ~7 min Analysis Time for TCE & PCE
- 200 Analyses per day; ~\$3 per analysis
- Multiple Sample Locations (10 to 30)
- Operating Costs: Power plus N<sub>2</sub> (<\$15/mo)
- Data Downloaded via Ethernet, Wifi, Cell
- Auto-Alerting Using Groundswell Software

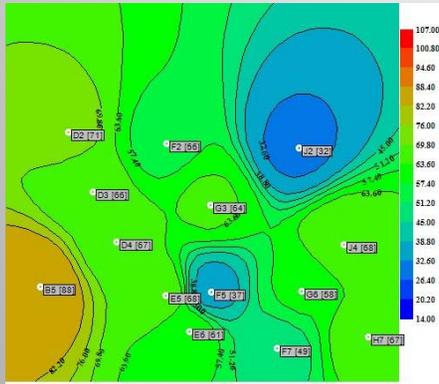


# Monitoring/Response Platform

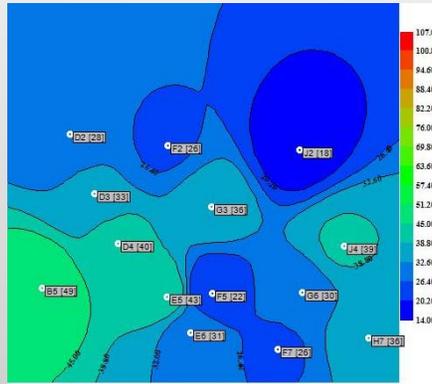


Remotely Document:  
Raw Data  
Moving Average  
HVAC/Venting On/Off Recording

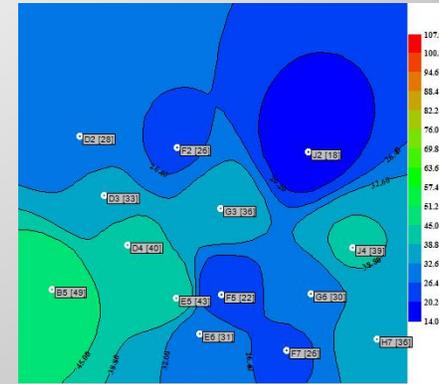
# Monitoring/Response Dashboard



Recent Data



8-Hr Ave



21-Day Ave

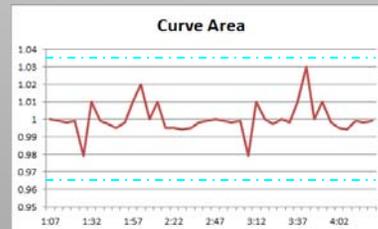
Contour for 21 Jan 2012 00:00:00 (14 DCPs) Jump To: 24 Mar 2012 00:00:00

00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
01 Jan 2012	07 Jan 2012	14 Jan 2012	21 Jan 2012	28 Jan 2012	04 Feb 2012
2	1	2	8	11	

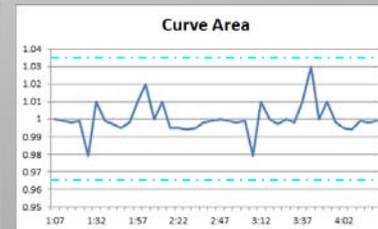
25 Total Unique Time Steps for this Channel

Playback Controls

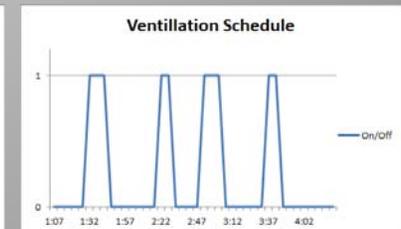
Begin 24 Mar 2012 00:00:00 End 09 Jun 2012 00:00:00



Audit Standard



PE Standard



Venting Schedule (Optional)

# Auto-Alerting

## **[GT Alert] Your Alert (Demo) for Project Hartman1 has been Triggered**

Groundswell Technologies Alerts <alerts@groundswelltech.com>

 This message was sent with High importance.

Sent: Fri 4/10/2015 10:39 AM

To: diff.frescura@groundswelltech.com

Cc: blayne@hartmaneg.com; mark.kram@groundswelltech.com

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Your Alert Has Been Triggered

Trigger Logic: Equal to or Greater Than (Data Value  $\geq$  Trigger Value)

Data Value: 79.2433 TCE ppbv

Reading Date and Time: 2/10/2015 15:12:16

Low Trigger Value: 19

High Trigger Value: 19

Trigger: 79.2433  $\geq$  19

Alerts can be viewed at <http://www.GroundswellTech.com/App/AlertHistory.aspx?p=58>

# Auto-Alerting

Project Portfolio > Alert History

Welcome Mark Kram Project: Hartman1 (ID:58)

Project Portfolio	My Profile	Config Groups	Config Users	Home	Log out
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Visualization	Raw Data	DCPs	Upload	Channels	Alerts	Project
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Export to Excel 

36 Alerts Were Triggered

Date Time Triggered	Low Trigger Value	High Trigger Value	Triggered Value	Email Sent	Trigger Logic
4/10/2015 10:39:28 AM	19	19	19.1967	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:28 AM	19	19	43.4304	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:28 AM	19	19	34.5995	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:28 AM	19	19	47.8996	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:28 AM	19	19	61.2347	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:28 AM	19	19	68.2356	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:28 AM	19	19	61.4225	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	19.1983	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	25.996	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	52.8549	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	79.9899	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	19.605	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	22.1744	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	24.4679	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	28.0691	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	35.9764	True	Equal to or Greater Than (Data Value >= Trigger Value)
4/10/2015 10:39:25 AM	19	19	41.6999	True	Equal to or Greater Than (Data Value >= Trigger Value)

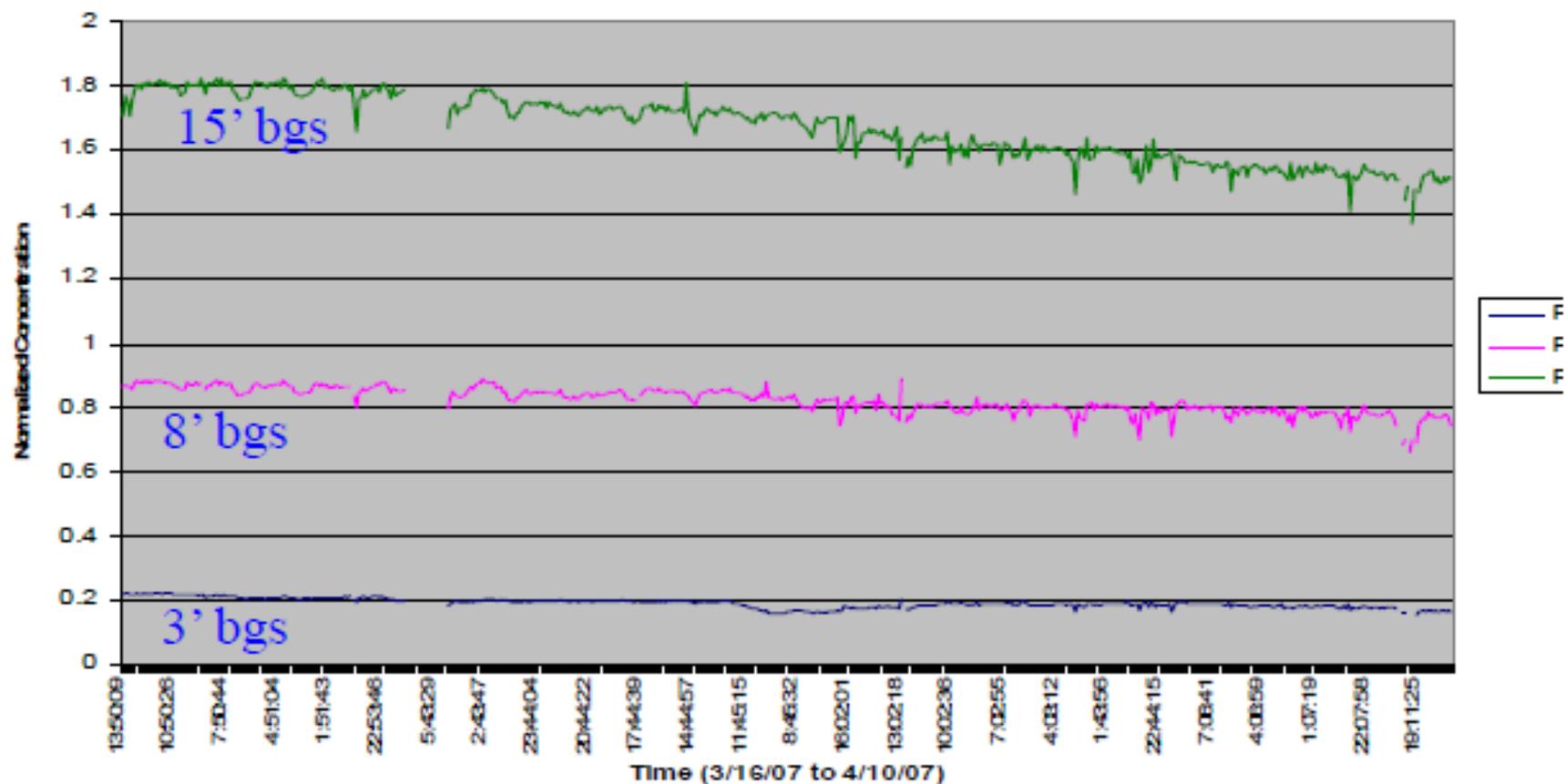
# Situational Awareness



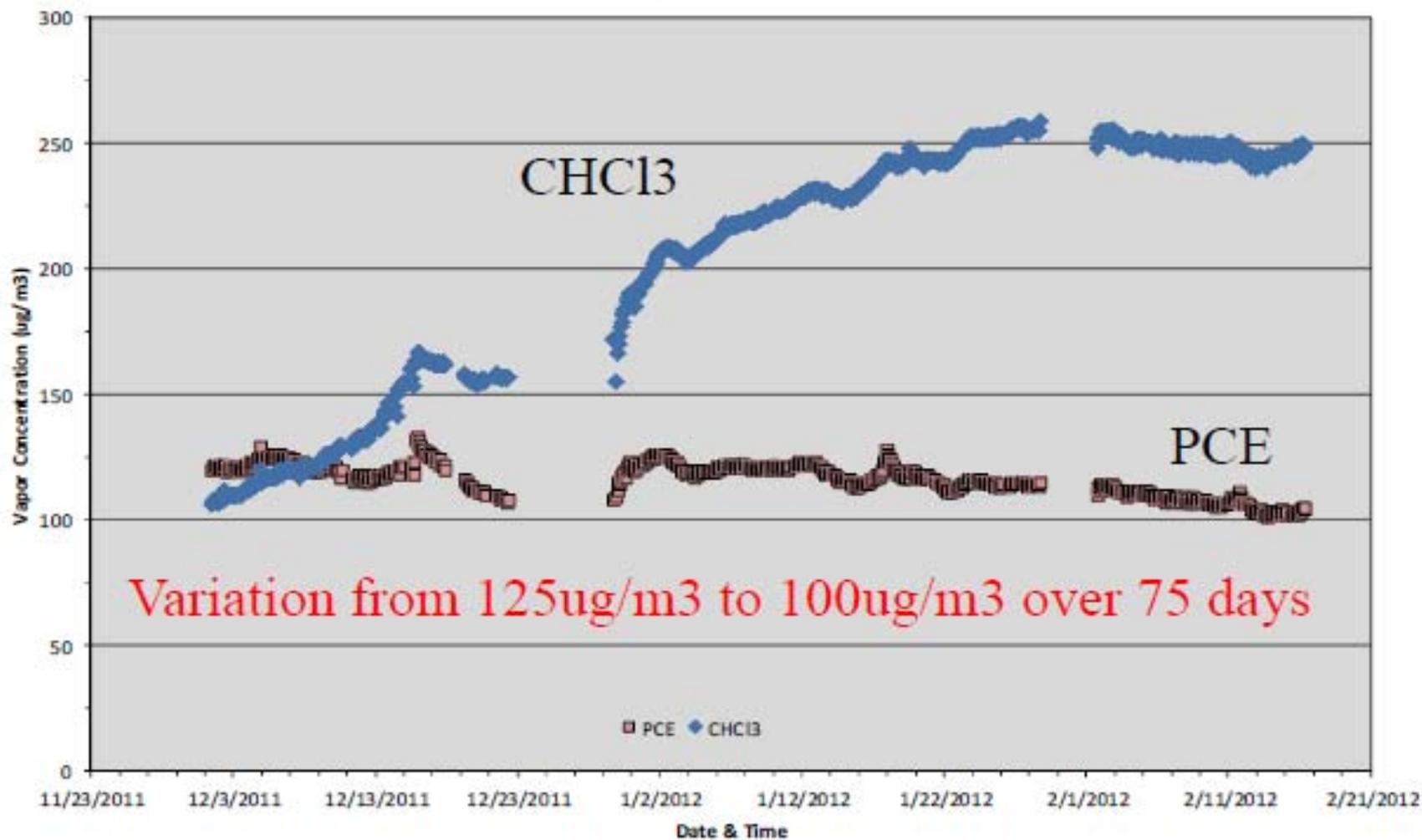
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# Soil Gas Temporal Study – EPA-ORD 2007

Probe A3 (TCE - Normalized)

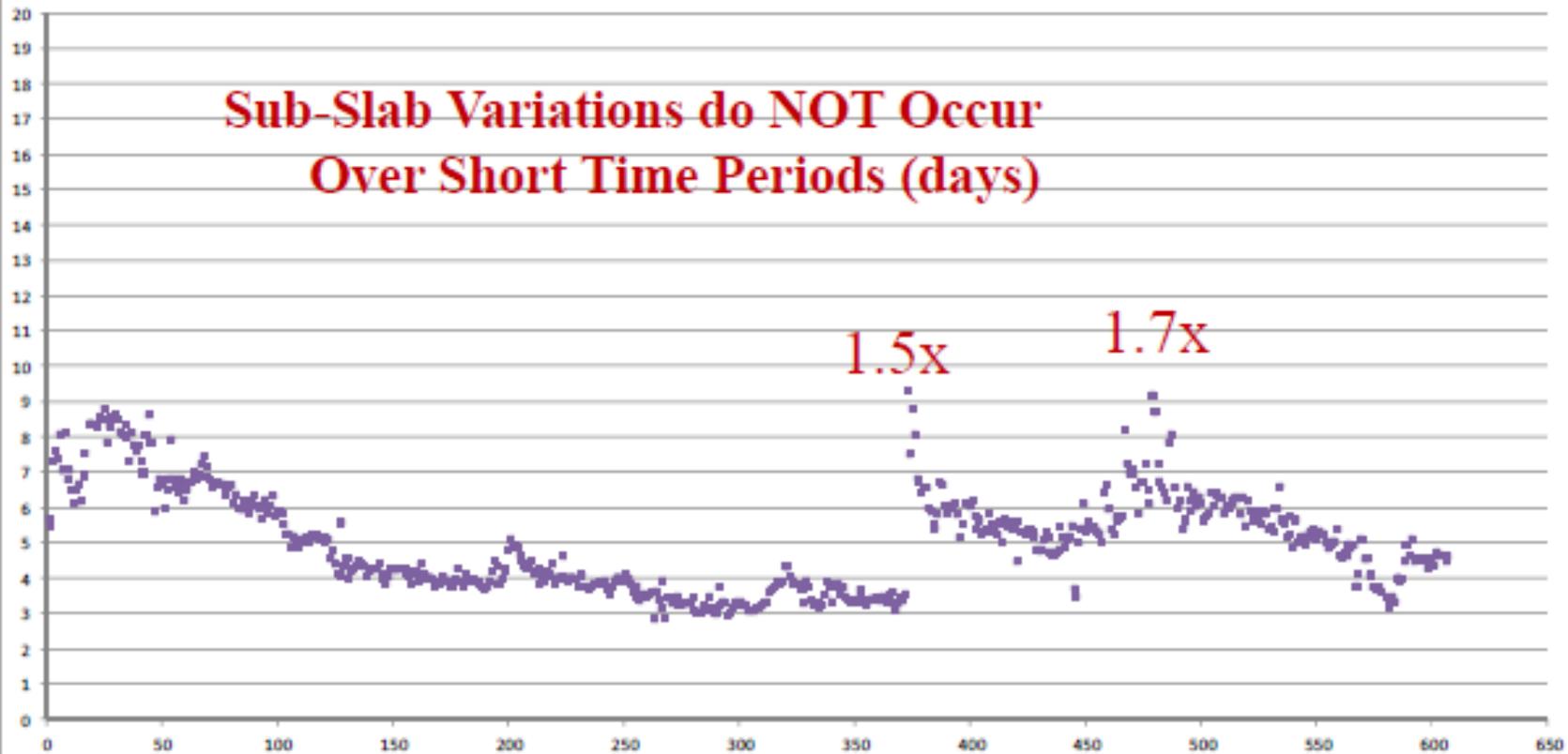


### PCE & CHCl3 - SGP9-6



# Sub-slab Soil Gas PCE Data

SSP-2 PCE



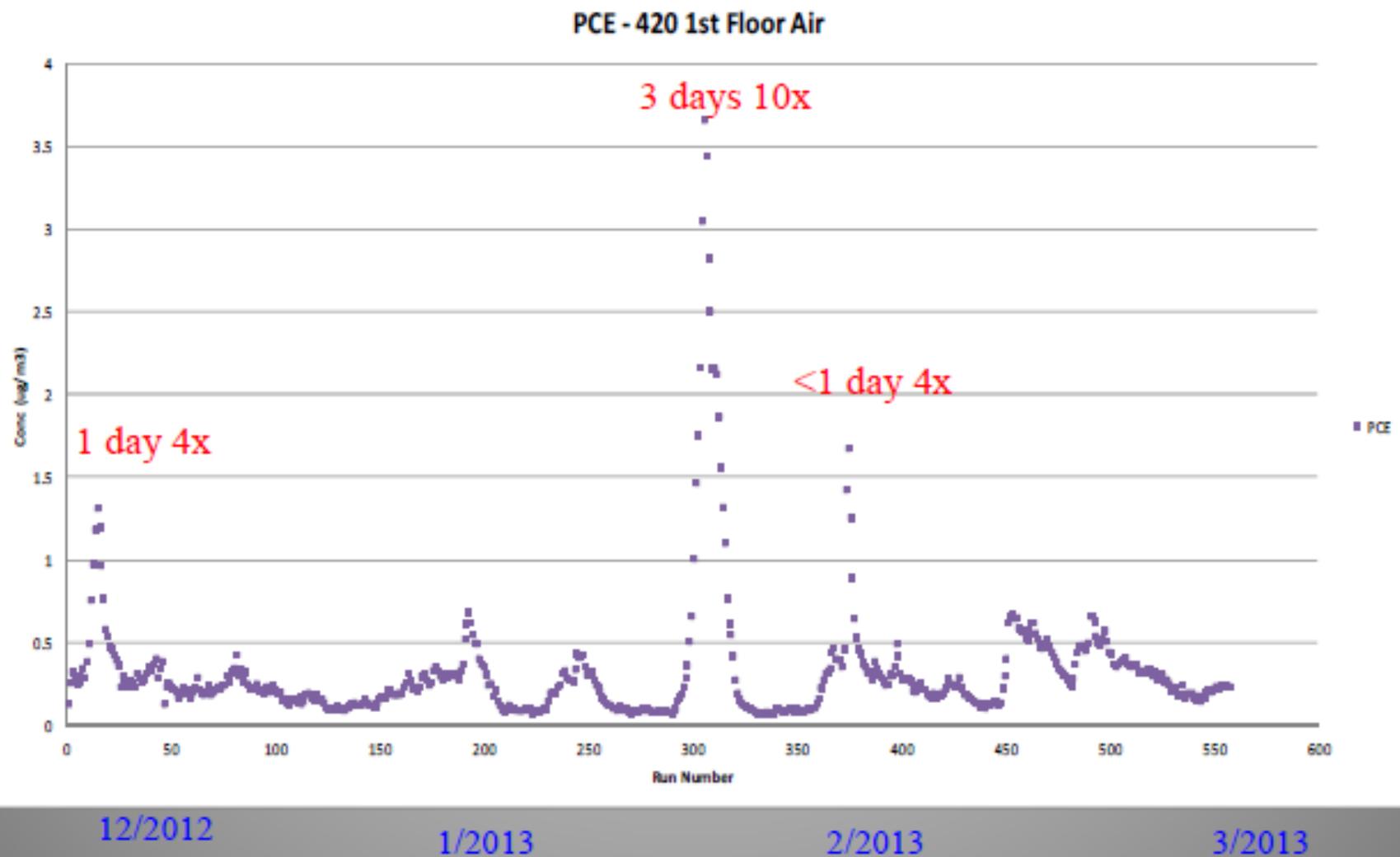
12/2012

1/2013

2/2013

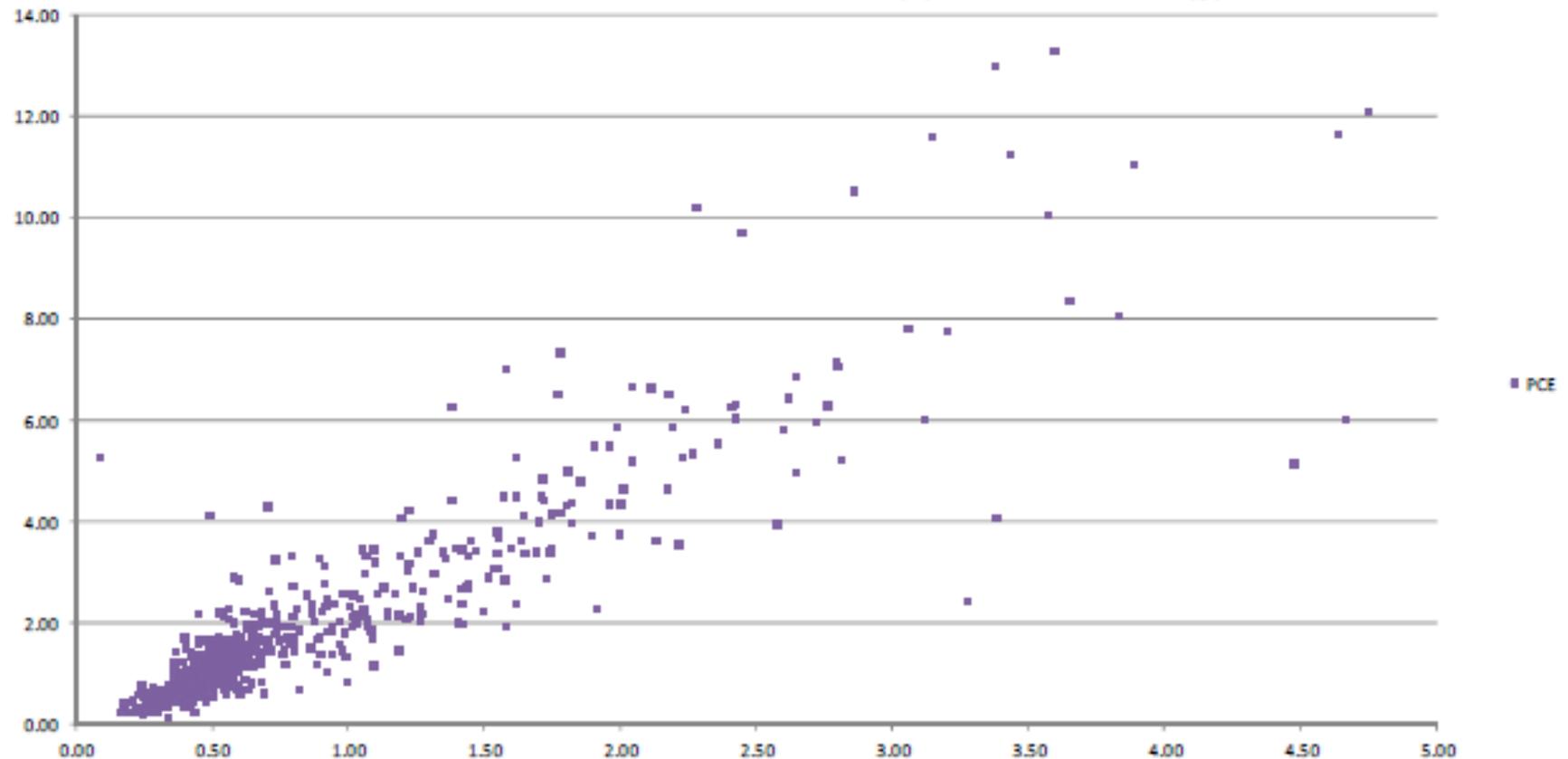
3/2013

# Indy Duplex – PCE in Indoor Air

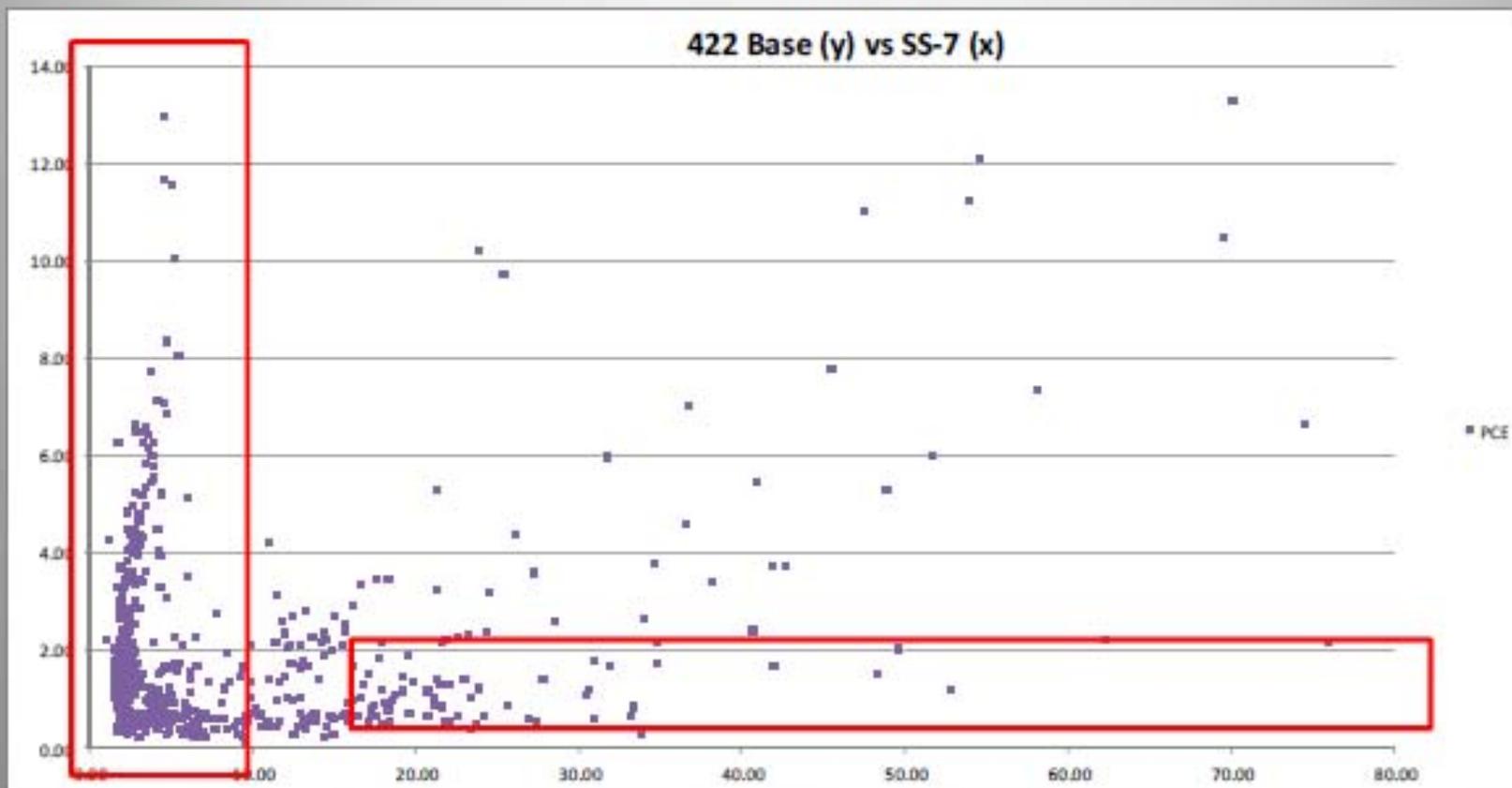


# Continuous Monitoring – PCE in Indoor Air

422 1st Floor (x) vs Basement Air (y)

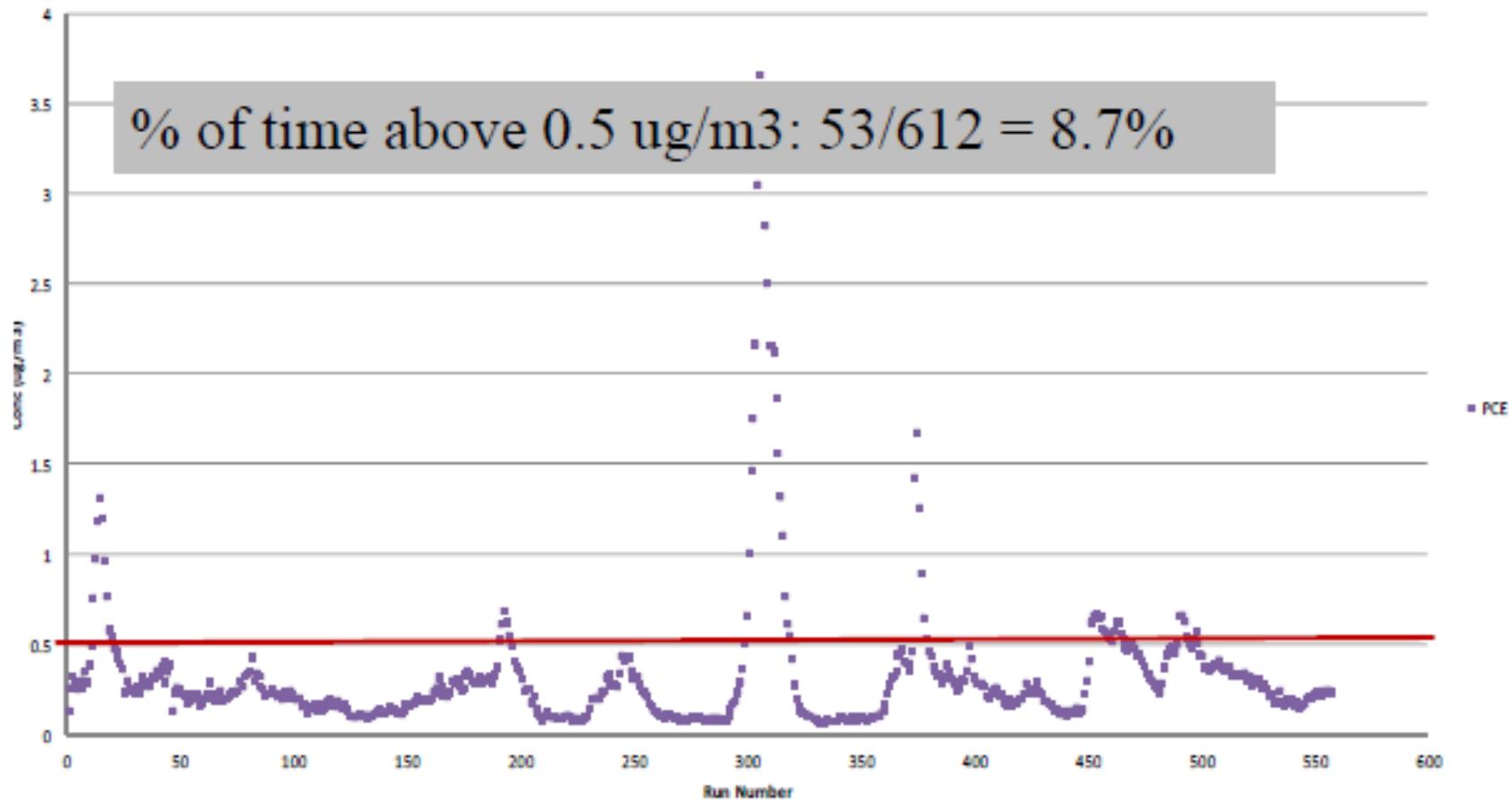


# Continuous Monitoring – PCE in Indoor Air



# Chronic "Facts"

PCE - 420 1st Floor Air



12/2012

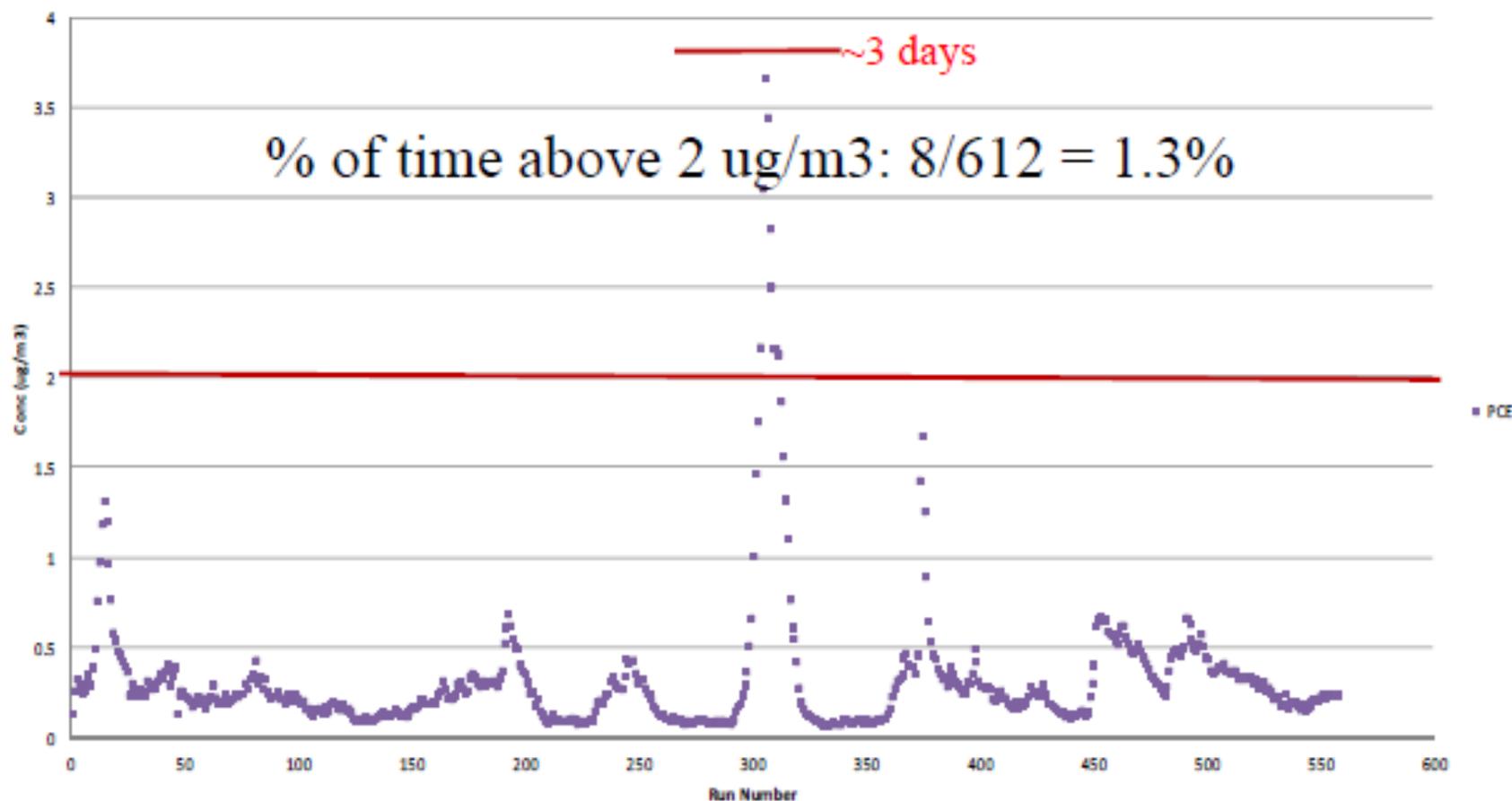
1/2013

2/2013

3/2013

# Short-Term "Facts"

PCE - 420 1st Floor Air



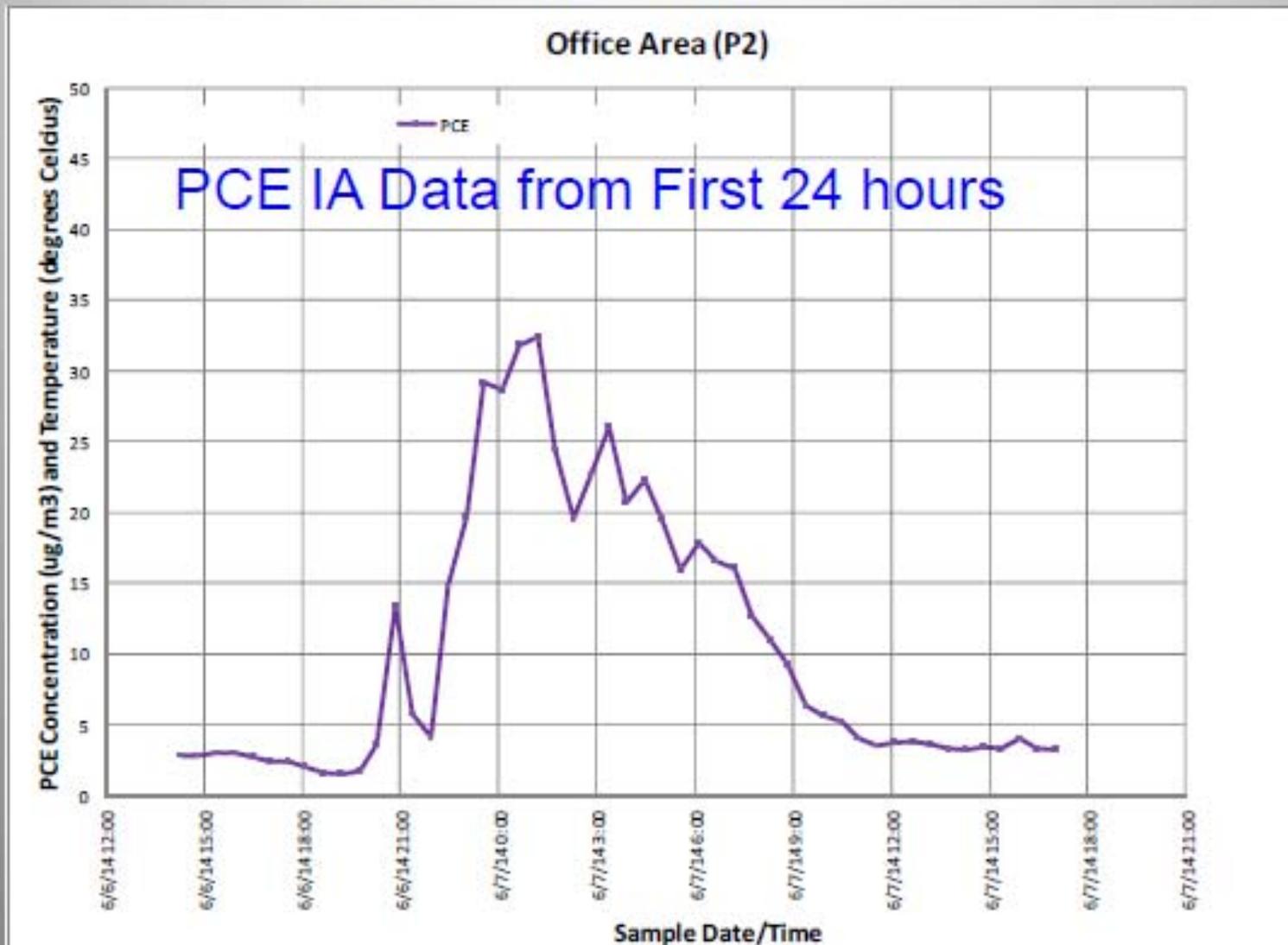
12/2012

1/2013

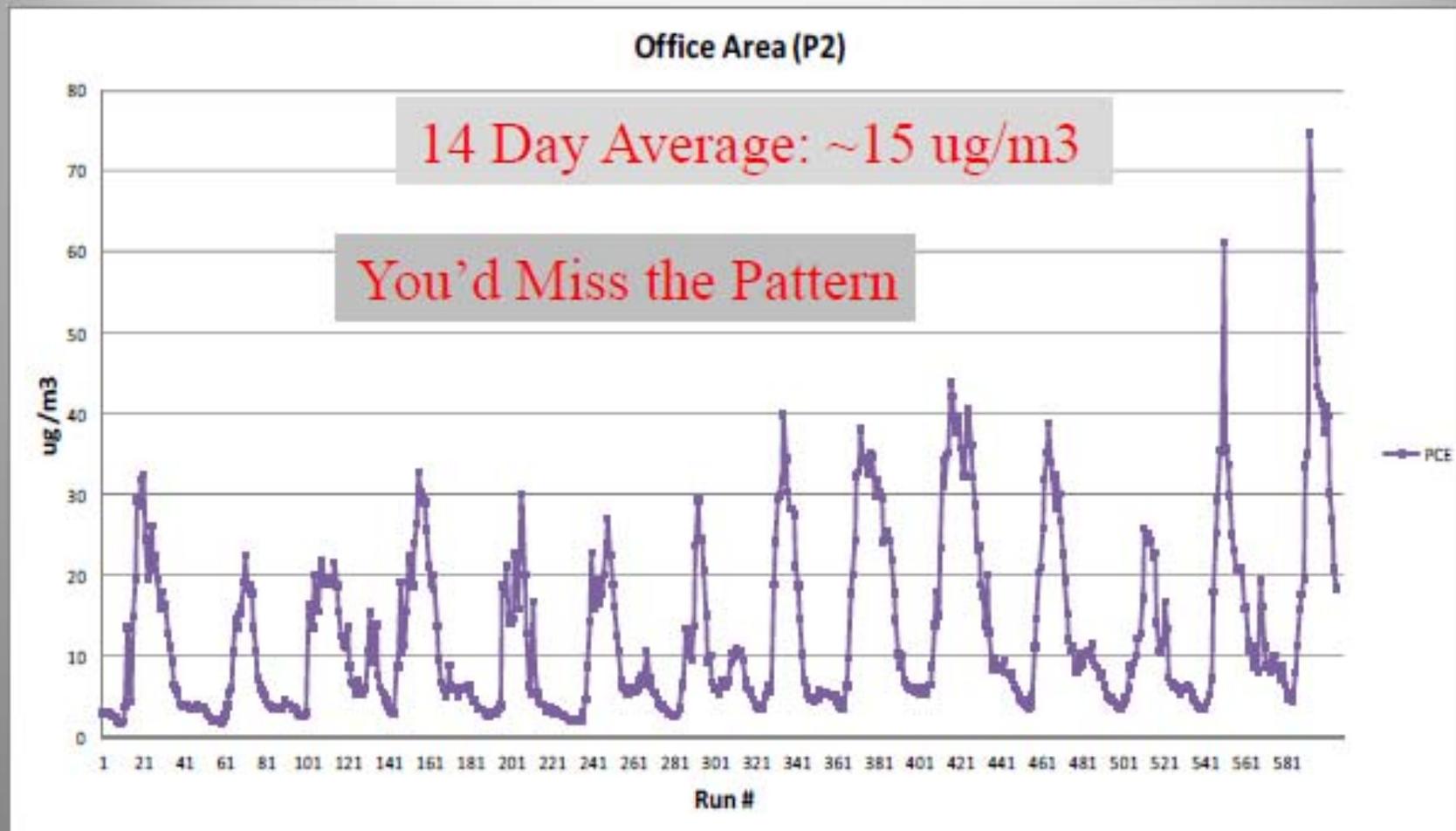
2/2013

3/2013

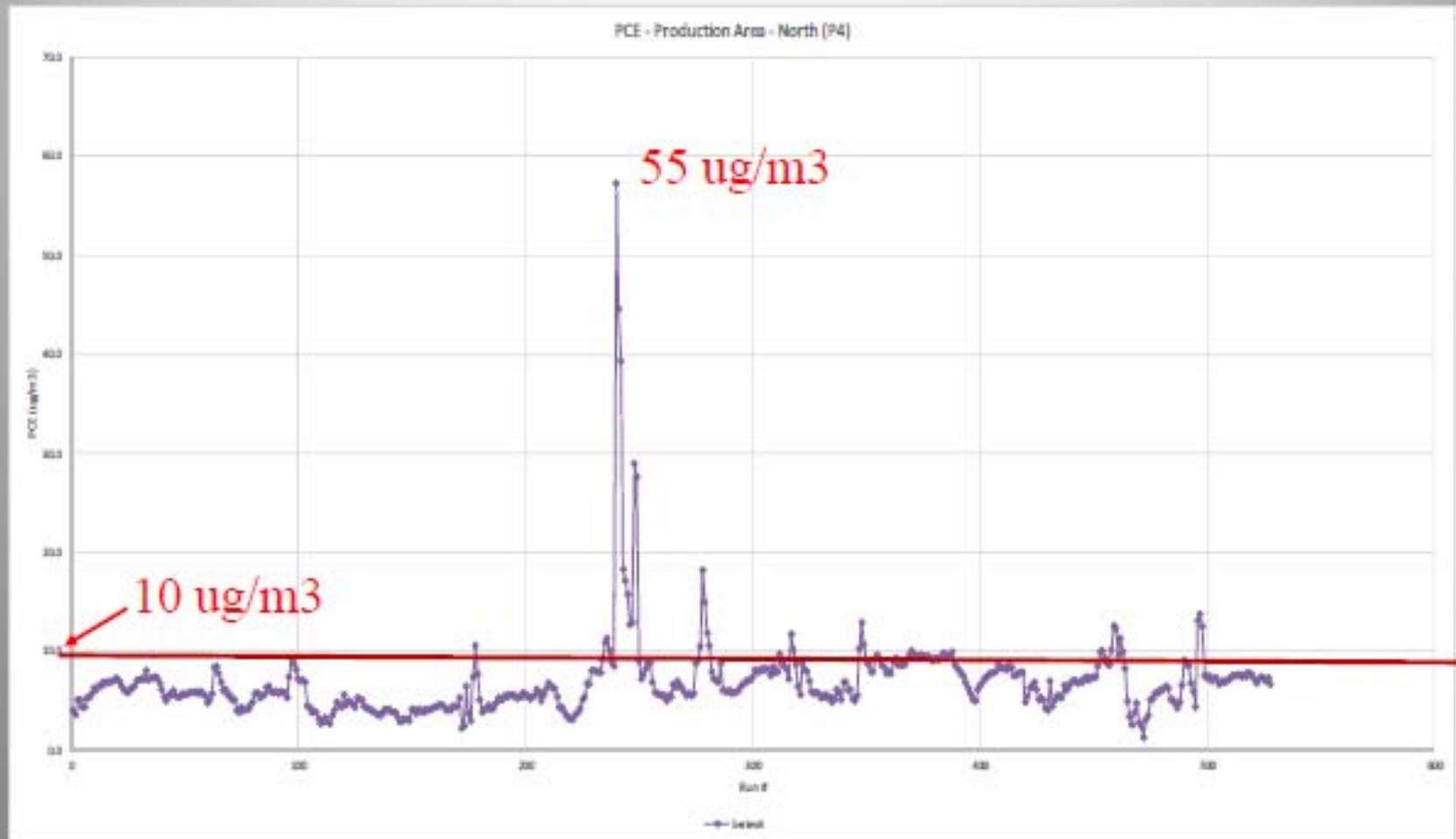
# Shop Air – PCE – June 2014



# 14 Days of IA Data – June 2014

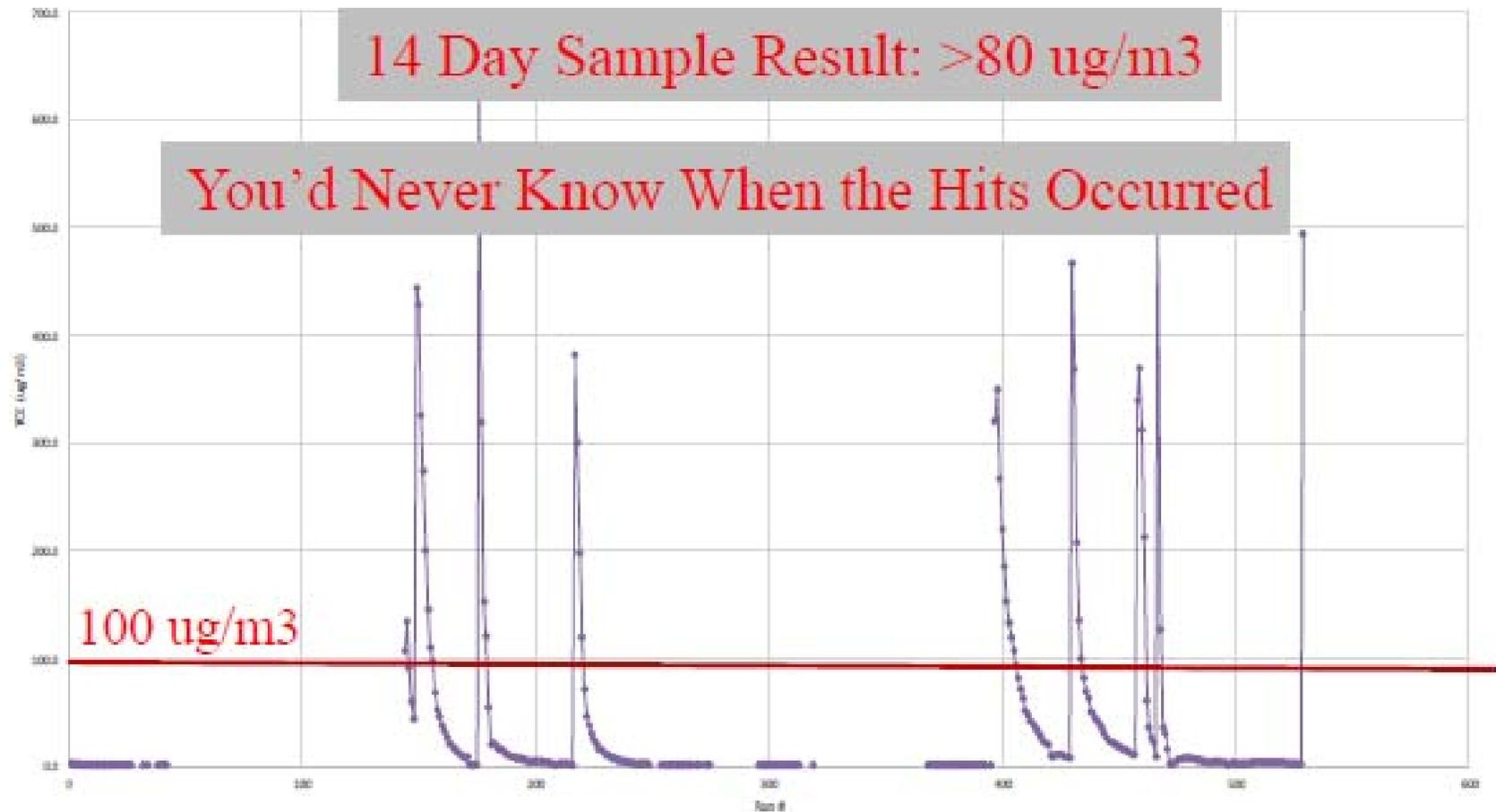


# Shop Air – PCE – February 2015



# Shop Air – TCE – February 2015

TCE - Production Area - South (P3)



# TCE vs PCE





Sprayway

# TONER AIDE

GREATLY IMPROVES TONER GENERATED IMAGE QUALITY

- DARKENS TONER
- 100% TRANSPARENT
- EASY SPRAY APPLICATION
- DRIES IN MINUTES

FOR USE ON PAPER, VELLUM, TRANSPARENCY FILM AND ANY DRY TONER GENERATED MEDIA

**CONTAINS NO METHYLENE CHLORIDE**



CONTAINS NO OZONE DEPLETING CHEMICALS

## DANGER:

EXTREMELY FLAMMABLE  
CAUSES EYE AND SKIN IRRITATION  
VAPOR HARMFUL  
CONTENTS UNDER PRESSURE

NET WT. 12 OZ. (340 GRAMS)



# MATERIAL SAFETY DATA SHEET

## 1. Product and Company Identification

**Product number** 208-003  
**Product name** **Toner Aide**  
**Effective date** 06-Jun-2011  
**Company information** Sprayway, Inc.  
 1005 Westgate  
 Addison, IL 60101 United States  
**Company phone** General Assistance 630-543-7600  
**Emergency telephone US** 800-424-9300  
**Emergency telephone outside US** 703-527-3887  
**Version #** 04  
**Supersedes date** 28-Dec-2007

## 2. Hazards Identification

**Emergency overview** Will be easily ignited by heat, spark or flames. Cancer hazard. Irritating to skin. Irritating to eyes. Irritating to respiratory system. Prolonged exposure may cause chronic effects. **EXTREMELY FLAMMABLE** CONTENTS UNDER PRESSURE. Aerosol.

**Potential health effects**

**Routes of exposure** Inhalation. Skin contact. Ingestion.

**Eyes** Causes eye irritation.

**Skin** This product may be harmful if it is absorbed through the skin. Irritating to skin. Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).

**Inhalation** Intentional misuse by concentrating and inhaling the product can be harmful or fatal. Irritating to respiratory system. Prolonged inhalation may be harmful.

**Ingestion** Exposure by ingestion of an aerosol is unlikely. May cause delayed lung damage. Components of the product may be absorbed into the body by ingestion.

**Target organs** 2-Butoxy ethanol may be absorbed through the skin in toxic amounts if contact is repeated and prolonged and may cause blood damage. These effects have not been observed in humans. Central nervous system. Lungs.

**Chronic effects** Unconsciousness. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. May cause delayed lung damage. Prolonged skin contact may produce dermatitis. Discomfort in the chest. Narcosis. Cyanosis. Jaundice. Defatting.

Si

TCE

15-20%

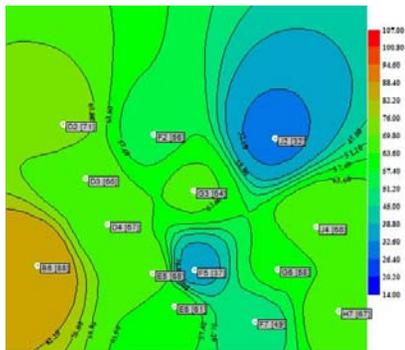
## 3. Composition / Information on Ingredients

Component	CAS #	Percent
n-Butane	106-97-8	20 - 30
n-Butyl Acetate	123-86-4	20 - 30
Trichloroethylene	79-01-6	15 - 20
Propane	74-98-6	10 - 15
Acetone	67-64-1	10 - 15
Stoddard Solvent	8052-41-3	1 - 3
2-Butoxyethanol	111-76-2	1 - 3
Non-hazardous and other components below reportable levels		1 - 2.5

# Long Term Costs (21-Day Passive Samplers)

# Locations	1	5	7	10	14
1 year	\$13,600	\$32,300	<b>\$41,000</b>	\$55,000	\$74,000
3 years	<b>\$41,000</b>	\$97,000	\$122,000	\$166,000	\$222,000
5 years	\$68,000	\$161,000	\$204,000	\$276,000	\$370,000
10 years	\$136,000	\$328,000	\$408,000	\$550,000	\$740,000
20 years	\$272,000	\$656,000	\$816,000	\$1.1 mil	\$1.5 mil

**Cost of System: \$35,000**



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