

The Vapor Intrusion Pathway: Regulatory Updates (& Time Permitting Other Musings)

SAM Forum

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Regulatory Topics

Red Hot

1. New EPA OSWER Guidance
2. New EPA OUST Sites (UST Sites)
3. Short Term TCE Exposure

Semi-Red Hot

1. ITRC PVI Guidance
2. Updated ASTM Phase 1 Standard

Colder: DTSC Soil Gas Advisory

EPA Guidance Updates



EPA OSWER Guidance

(June 2015)



- Sub-slab Att factor of 0.03 (3.3x increase in SLs)
- It's not 200 pages long (only 185)

<http://www.epa.gov/oswer/vaporintrusion>

EPA OSWER Guidance



June 2015)



- Multiple lines of evidence (more expense & chances to fail)
- Preference for soil gas near source (terrible for HCs!)
- Longer indoor air sampling period (terrible for HCs!)
- Fixed Att factor of 0.03 for shallow SG (~15x drop in SLs)
- Sampling protocols inconsistent with EPA-ORD studies!!

<http://www.epa.gov/oswer/vaporintrusion>

FPA OSWER Guidance

(Effective: June 2015)



- Applies to non-UST Petroleum Sites
- Claim Jurisdiction to Businesses!!
- Very Difficult to Read
 - Poorly organized

Will Complicate VI Assessments

- Paragraphs fragmented with references and footnotes
- Verbose and repetitive

EPA OUST Guidance

June 2015)



- Exclusion Criteria for GW & **Soil!!**
- Concise. Organization Good
- Near-Slab Soil Gas Data OK
- Discusses Models with Bioattenuation



Table 3 Required Vertical Separation Distance Between Contamination And Building Foundation, Basement, Or Slab.

Media	Benzene	TPH	Vertical Separation Distance (feet)*
Soil (mg/kg)	≤10	≤250	6
	>10 (LNAPL)	>250 (LNAPL)	15**
Groundwater (ug/L)	≤		6
	>5,000 (LNAPL)	>50,000 (LNAPL)	15**

Must Have “Clean Soil”

The thresholds for LNAPL indicated in this table are indirect evidence of the presence of LNAPL. These thresholds may vary depending on site-specific conditions (e.g., soil type, LNAPL source). Investigators may have different experiences with LNAPL indicators and may use them as appropriate. Direct indicators of LNAPL also apply; these include measurable accumulations of free product, oily sheens, and saturated bulk soil samples.

*Vertical separation distance represents the thickness of clean (TPH ≤ 100 mg/kg), biologically active soil between the source of PHC vapors (LNAPL, residual LNAPL, or dissolved PHCs) and the lowest (deepest) point of a receptor (building foundation, basement, or slab).

** EPA recommends that sub-slab monitoring be used to evaluate the risk of vapor intrusion whenever LNAPL is present in any sample and the vertical separation distance is less than 15 feet. When LNAPL is

Definition of “Clean” Soil

Typically one of:

- Soil Phase TPH (<100 mg/kg)
- Oxygen in Vadose Zone (EPA: 1%, CA: 4%)
- Soil Headspace PID Data (<100 ppmv)

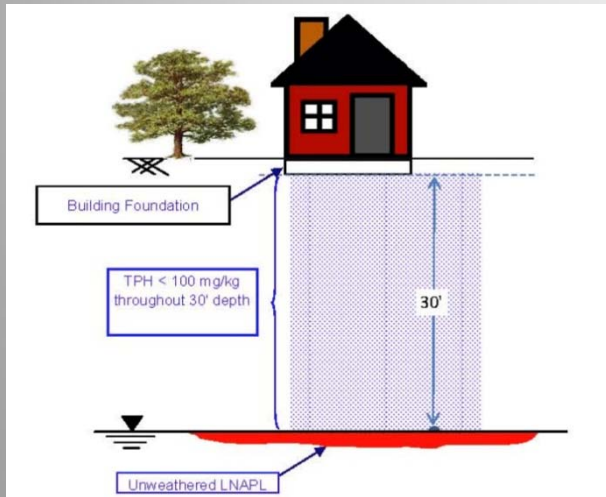


States Adopting Exclusion Criteria

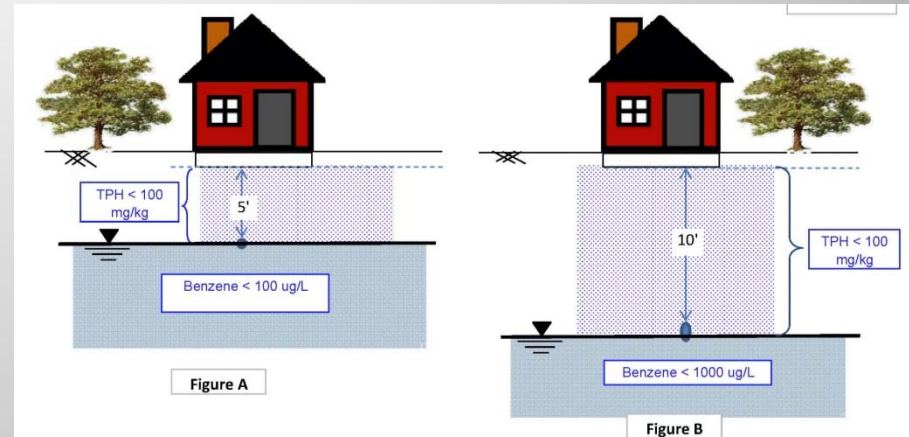
- CA
- NJ
- AK
- IN
- LA
- VT
- MI
- WI
- IL

ITRC PVI Guidance

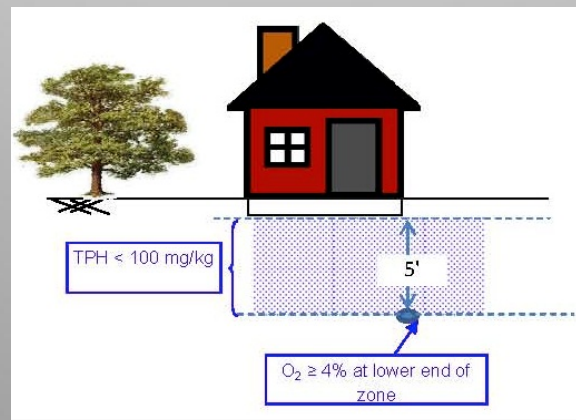
CA Low Threat Closure Policy VI Scenarios



LNAPL: 30'



Dissolved: 5' or 10'



Dissolved with O₂

EPA OUST Guidance



(Updated from the 2015)



- Lateral Exclusion Distances Diff Than Vertical
- No Screening Levels for Soil Gas
 - Calculate from Att Factor
- Can't Use Biomodels As An Exit

EPA OUST Guidance

(Release Date: June 2015)



- Attenuation Factor Text is Contradictory
 - Section 10
 - Section 11
 - Section 12
- **Will Reduce # of PVI Sites** LOE
- EDB
 - Screening levels of GW 0.18 ug/L & SG 0.16 ug/m3!!!

Allowable Benzene in GW

1e-6 cancer risk level

- New OSWER Guidance GW SL:

$$0.31 \text{ ug/m}^3 / 0.001 = 0.31 \text{ ug/L} / 0.2 = \sim 1.5 \text{ ug/L}$$

- EPA-OUST Exclusion Value: 5,000 ug/L

OSWER ~3330 times lower than OUST!!

OSWER has Jurisdiction over other Petroleum Sites

Soil Gas Allowed Levels

Benzene, Residential Receptor, 1e-6 Risk

	RBSL (ug/m ³)
EPA OSWER @ 5'	10.3
EPA OSWER Sub-slab	10.3
EPA OUST (from GW)	1,000,000
CA Low-Risk Policy: O ₂ >4%	85,000
CA Low-Risk Policy: O ₂ <4%	85
CA Sub-slab	1.6

Semi-



Topic #1:

ITRC PVI Document

ITRC PVI GUIDANCE

(Web Based Version Released 10/2014)

1. Introduction
 2. Site Screening and Prioritization
 3. Investigative Framework for PVI Sites
 4. Use of Models
 5. Mitigation
- Appendix: Toolbox – Update of 2007 Toolbox

Web & Classroom Training: 2015

Toolbox – Appendix G

Investigation Methods & Analysis

- What Type of Samples to Collect?
 - Table G-6. Pros and Cons of Various Investigative Strategies
- Proper Sampling Methods
 - GW, IA, Soil Gas, Other
- Misc Forms & Check Lists

Includes videos, step-by-step instructions, list of analysis methods and more.....

Semi-



Topic #2:

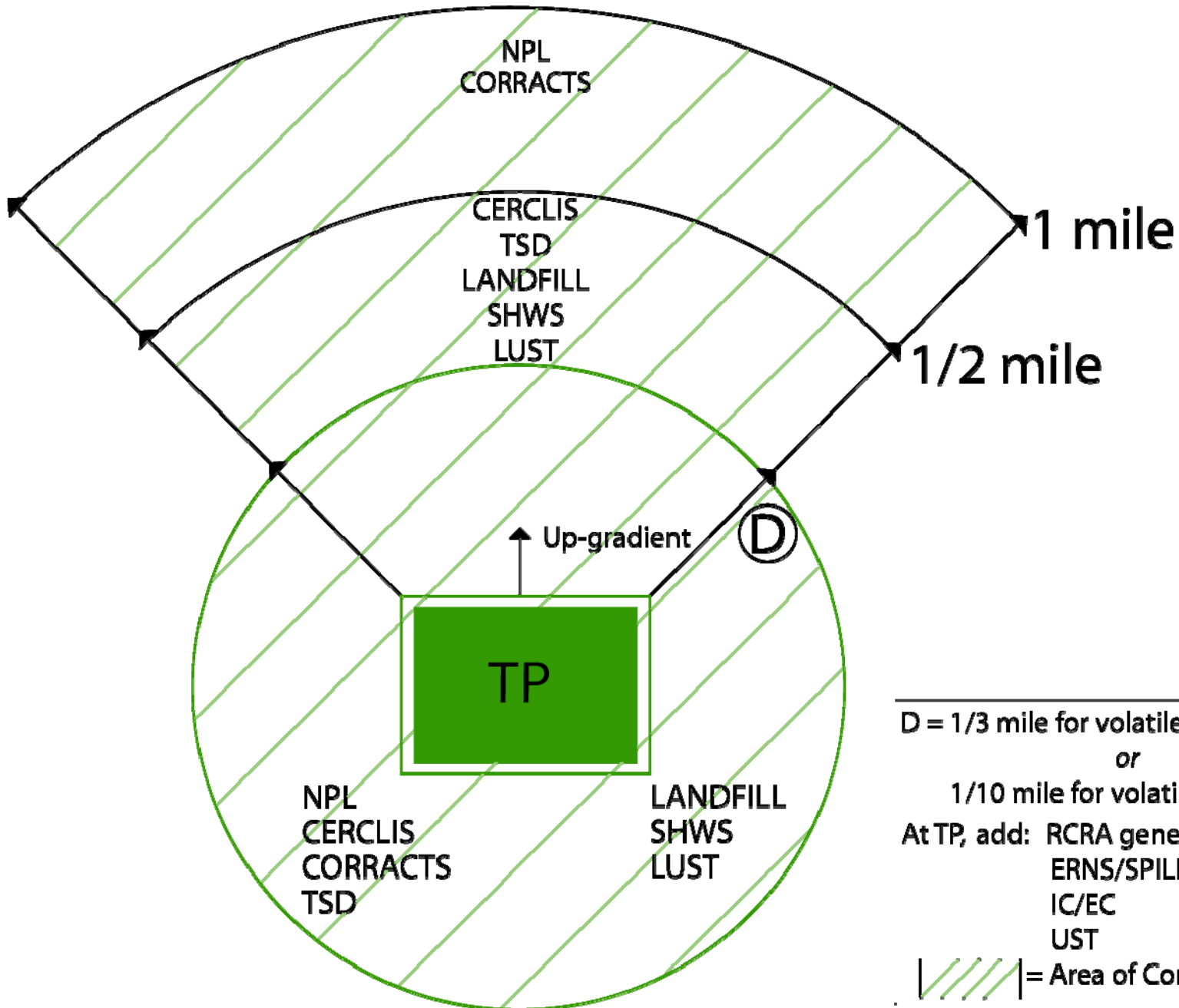
New ASTM Phase I Standard

Newest ASTM Phase 1 Standard

- Vapor “Migration” Now A VEC
- Long Distances: Cl-HC:1728’, PHC: 528’
- Use Applicable Screening Values
- Most Sites Will Not Be Closed

Result: More VI Sites

SEARCH DISTANCE TEST



D = 1/3 mile for volatile chemicals

or

1/10 mile for volatile petroleum HCs

At TP, add: RCRA generators

ERNS/SPILLS

IC/EC

UST

Area of Concern

Liability Concerns

- Phase I Environmental Consultant
- Prospective/Current Property Owner
- Property Lender
- Property Insurer



What Will be the Impact on Real Estate Transactions?

DTSC Soil Gas Guidance Changes (Updated Summer 2015)

- Site Assessment Changes
 - Keep drilling deeper until vapors are non-detect
 - Deeper soil gas samples required if deeper source
 - Large volume sub-slab sampling
- Purge Volume Changes
 - No more purge volume test – 3 PVs ok **YEA!!!**
 - Always purge the sand and dry bentonite, no matter how old the probe
- Probe Construction Changes

This Pathway's Got ... Legs



And this means:





VI Assessment Issues

1. Long Term Indoor Air Samples
2. Depressurization of Buildings
3. Indoor Air Snapshots for Cl-VOCs
4. Is Sub-Slab Sampling Useful?
5. How to Measure TCE Every 10 Minutes



VI Regulatory Topic #3:

Short Term TCE Exposure



New Region 9 TCE Guidelines (As of July 2014)

- Short Term TCE (Fetal Malformation)
 - Above 2 ug/m³ in 3 week period of 1st trimester
 - Covers Pregnant & Potentially Pregnant Employees!!
- Prompt Response Action Level (within 30 days!)
 - Residential: 2 ug/m³
 - Commercial: 7 - 8 ug/m³

Exposure Time: 24 Hours or 21 Days?

The word "HOT" is written in a bold, yellow, sans-serif font. The letters are filled with a bright orange and yellow flame effect, giving the text a fiery appearance. The background behind the text is black.

VI Assessment Point #5 Short-Term TCE Sampling

- Passive Collectors Every 21 Days
 - 17 times/yr ~ \$10,000 for 1 location
 - Correct exposure time for businesses/schools?
- Continuous Analyzers
 - Measures TCE & PCE every 10 minutes
 - 15 to 30 locations
 - Remote Access & Control via Internet
 - Real Time Alerts
 - System Cost ~\$35,000

Continuous Monitoring Devices



GC-ECD



Not Stable

Expensive (\$125K)

Hapsite GC/MS

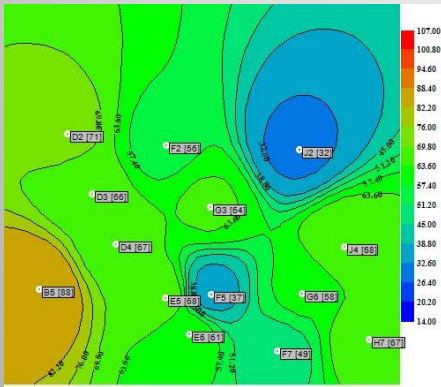


Non-Selective

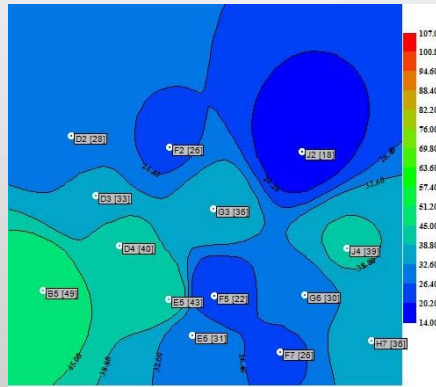
~\$25K

Frog4000 GC/PID

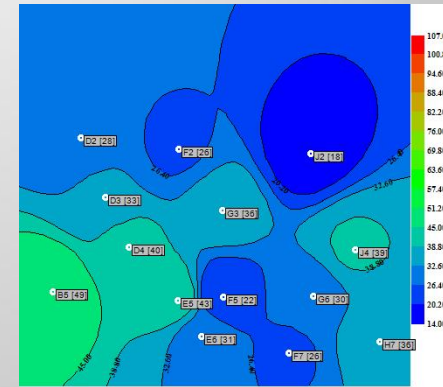
Monitoring/Response Dashboard



Recent Data



8-Hr Ave



21-Day Ave

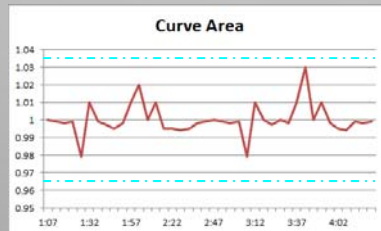
Contour for 21 Jan 2012 00:00:00 (14 DCPs) Jump To: 24 Mar 2012 00:00:00

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	24 Mar 2012
2	1	2	8	11	

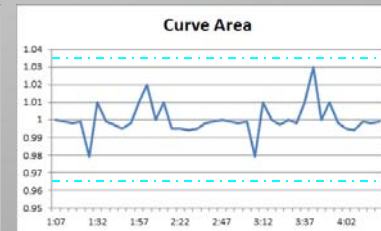
25 Total Unique Time Steps for this Channel

Playback Controls

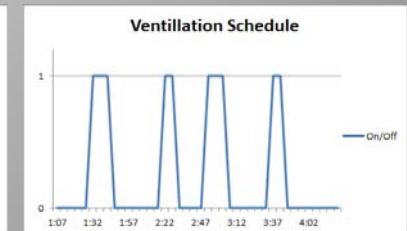
Begin 24 Mar 2012 00:00:00 End 09 Jun 2012 00:00:00



Audit Standard



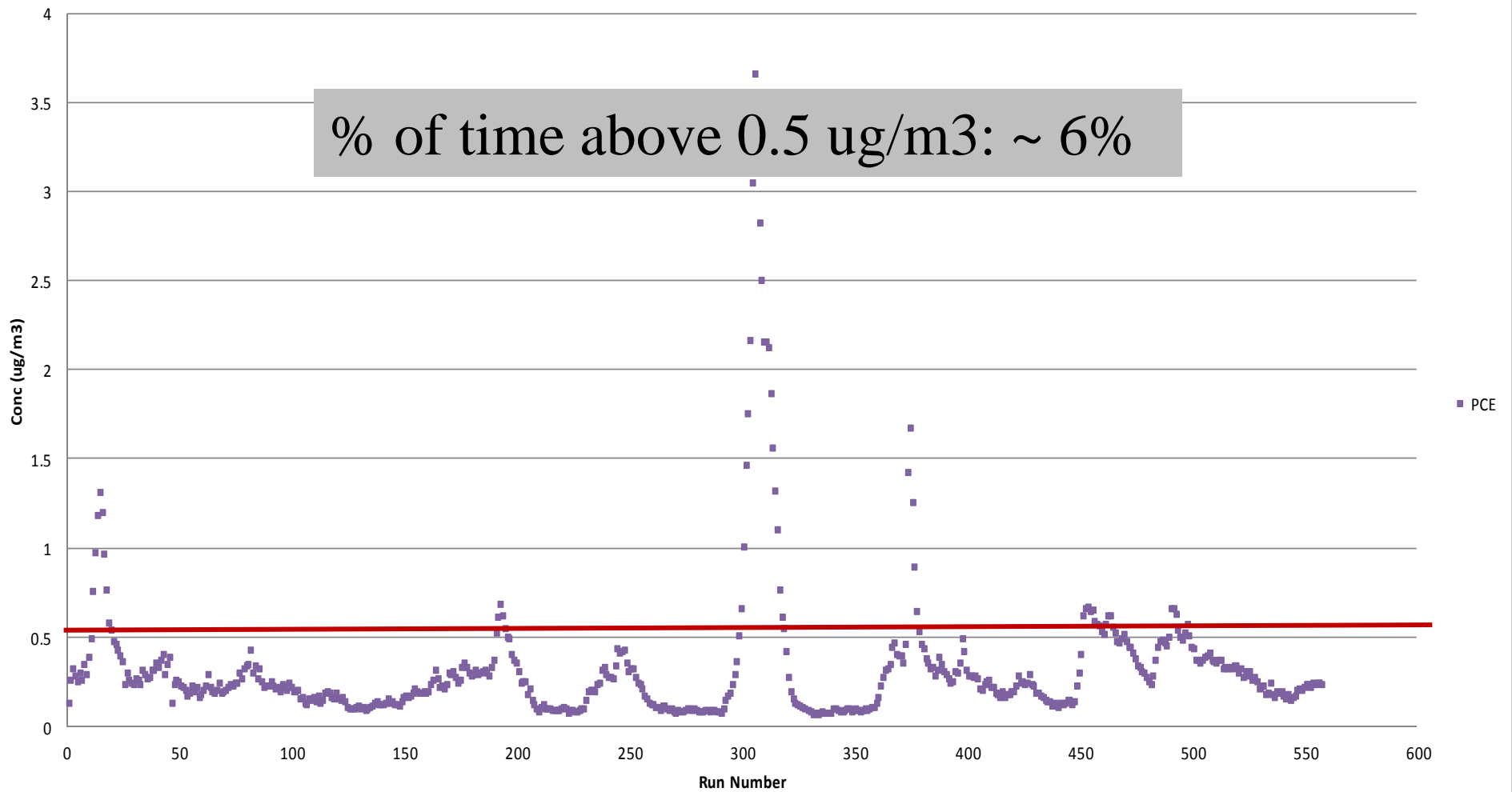
PE Standard



Venting Schedule (Optional)

Chronic "Facts"

PCE - 420 1st Floor Air



12/2012

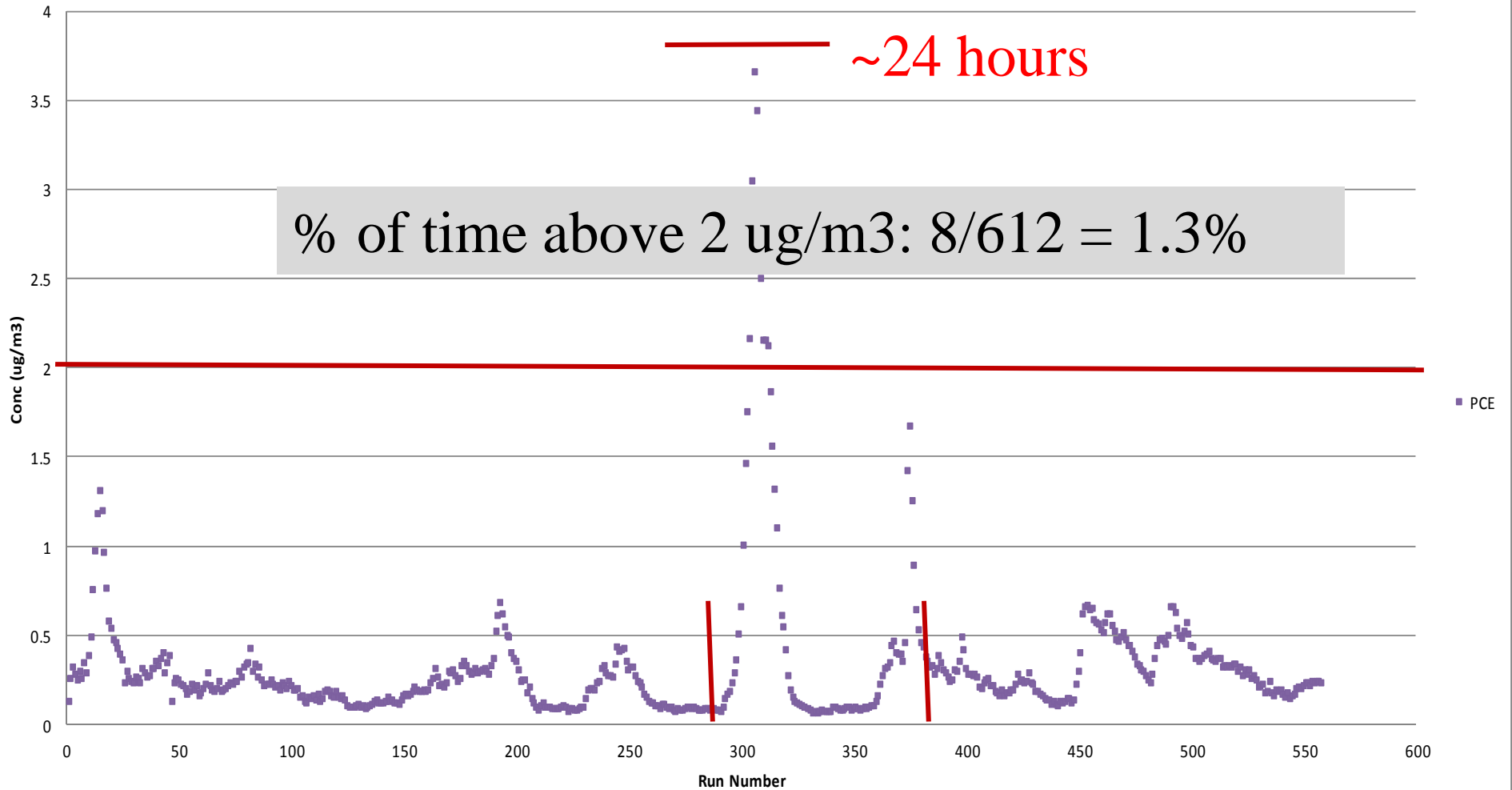
1/2013

2/2013

3/2013

Short-Term "Facts"

PCE - 420 1st Floor Air



12/2012

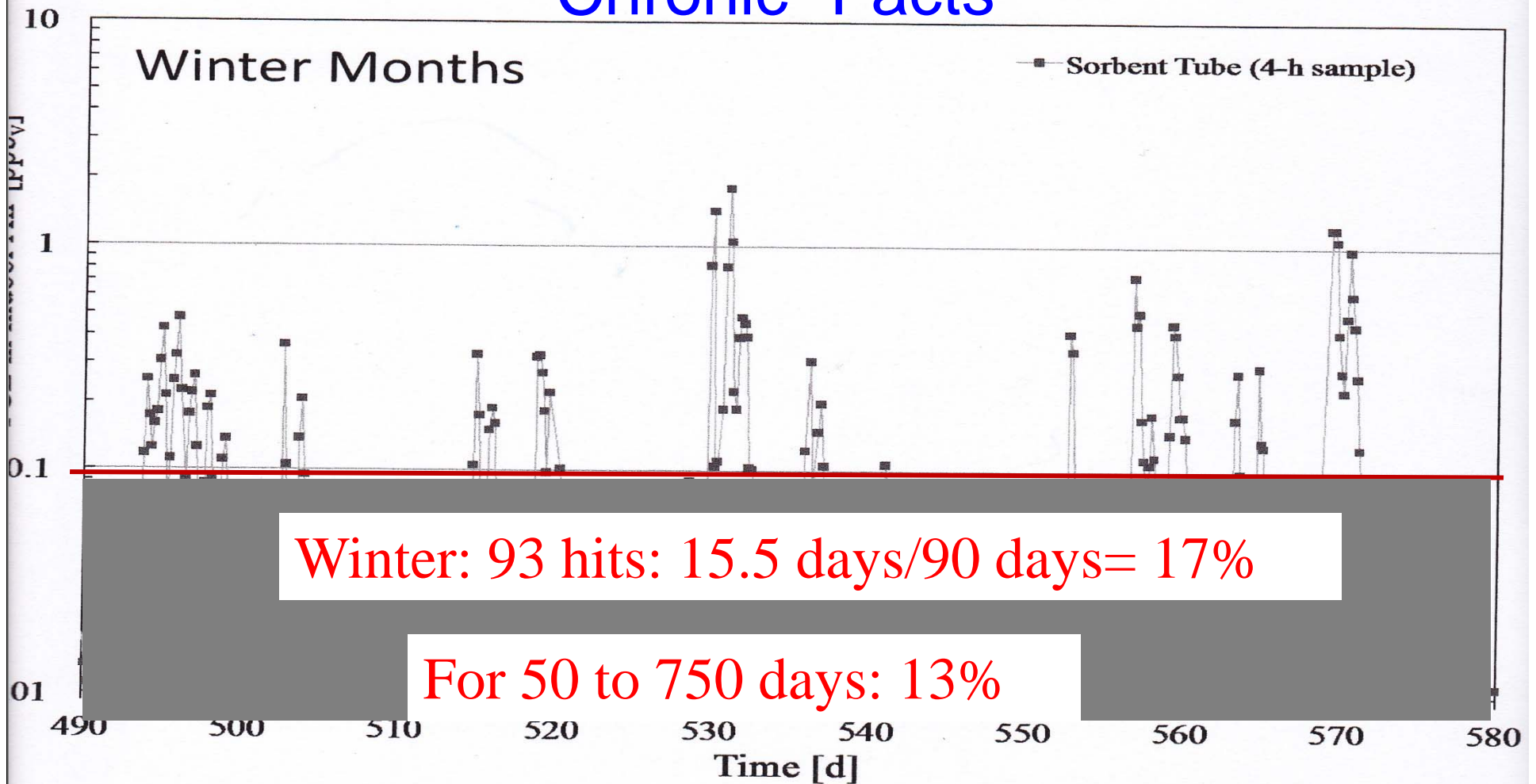
1/2013

2/2013

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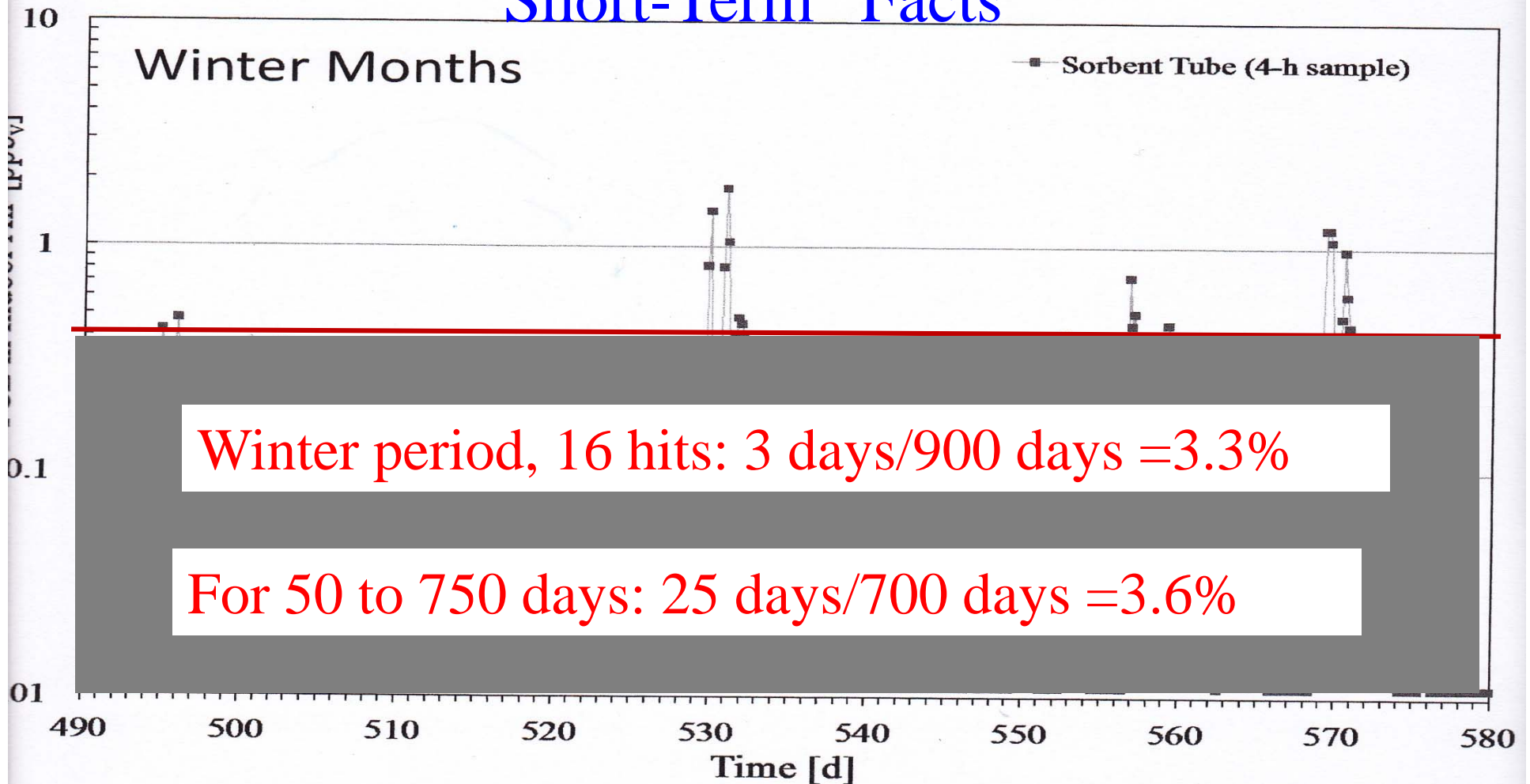
Indoor Air Concentrations

Chronic "Facts"



Indoor Air Concentrations

Short-Term "Facts"



Upcoming VI Events

- 2-Day VI Course – Memphis Oct 29 & 30, 2015
– www.hartmaneg.com
- AEHS VI Conf – Amherst MA, Oct 2015
- AEHS VI Conference – San Diego March 2016
- Battelle C1 Conference – Palm Springs, May 2016



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