

# CONCRETE & MATERIAL SAMPLING

*Sample techniques for evaluating materials and  
structures for potential  
VOC contamination*

Ohio Brownfield  
Conference 2014

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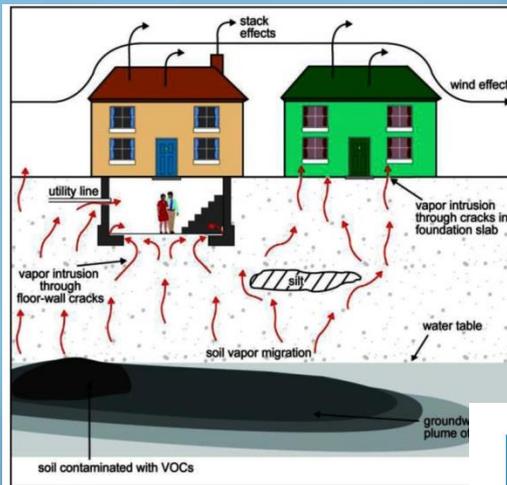


**OhioEPA**  
Site Investigation Field Unit

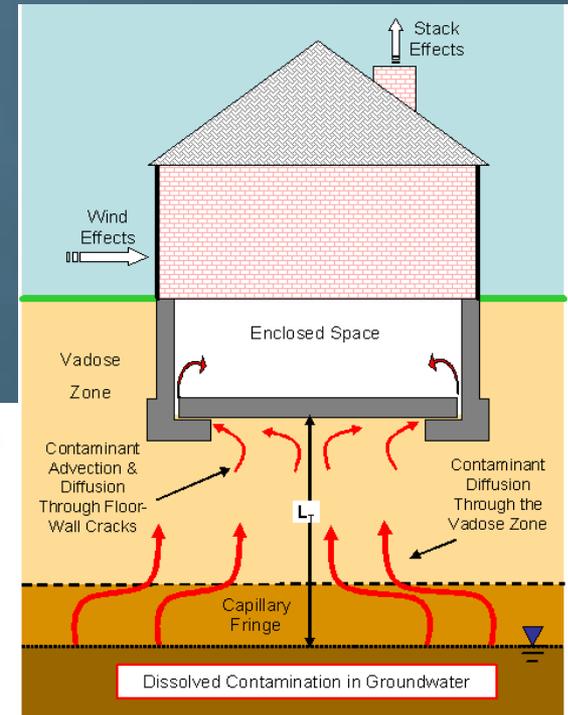
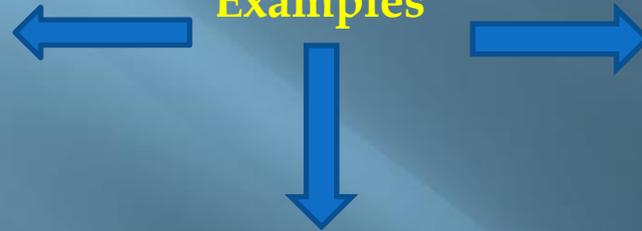




# Conceptual Site Models for the Vapor Intrusion Pathway are vital to the overall successful evaluation of both real and potential contaminant exposures.

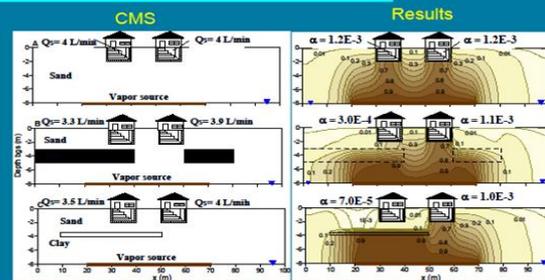


## CSM Examples



## Heterogeneous Subsurface

Results in spatial variability of soil gas concentration distribution



We could (and probably should) talk about this the rest of the afternoon...

By definition; Vapor intrusion is defined as vapor-phase migration of volatile organic compounds or volatile inorganic compounds into occupied buildings from underlying contaminated groundwater or soil.

(<http://www.epa.gov/ada/gw/vapor.html>)

Conceptual Site Models demonstrate this....



**BUT WHAT  
IF?**

**?**

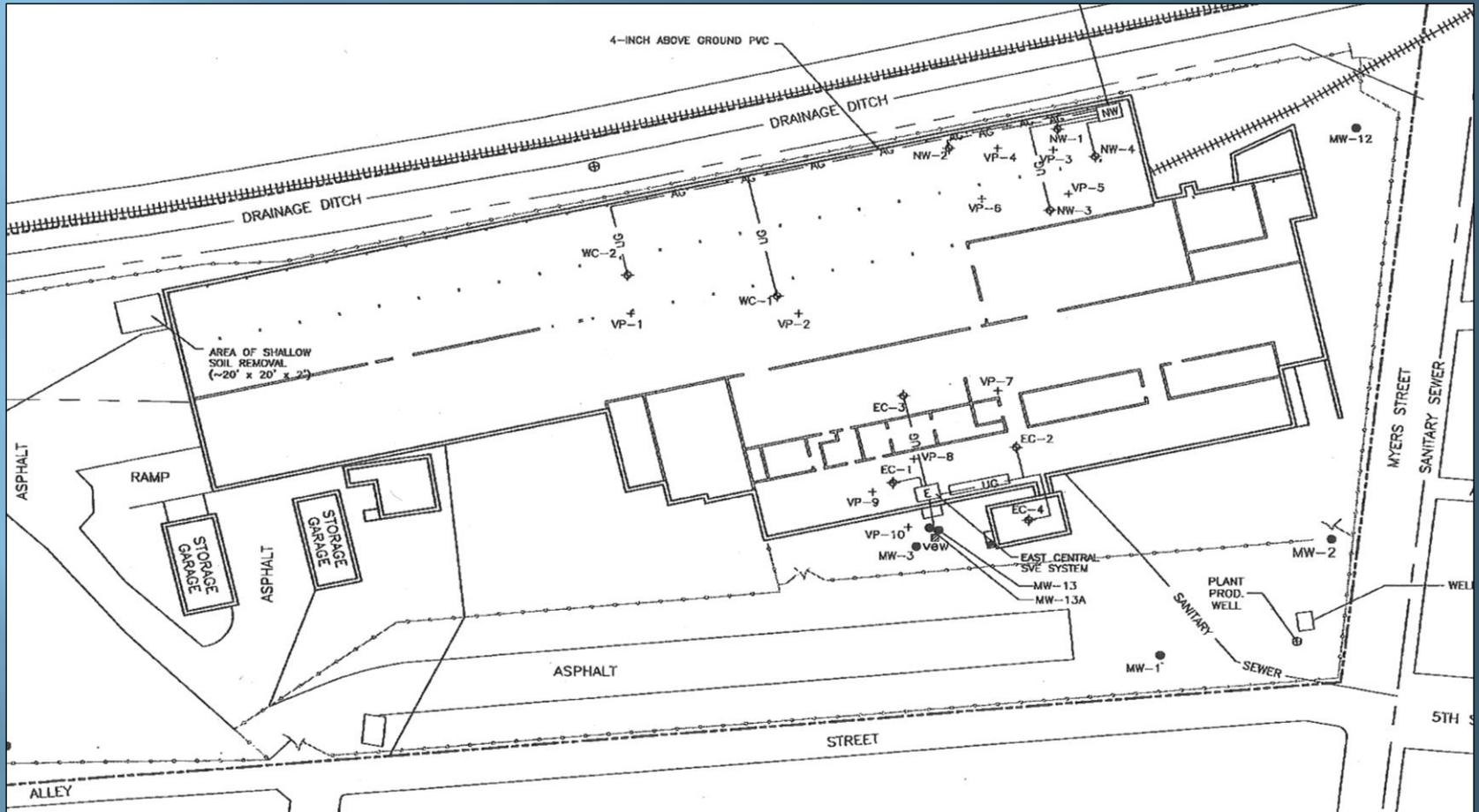


**The vapor-phase source of contamination is from the building and/or materials in the building itself...**

# Obvious signs of stained flooring/concrete



# Purpose for evaluating the building itself

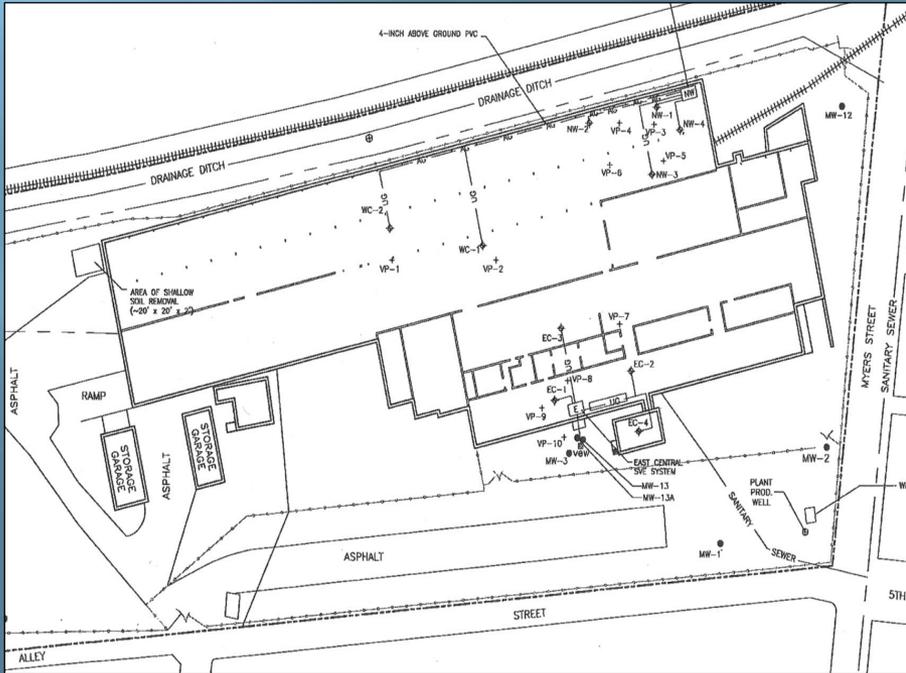
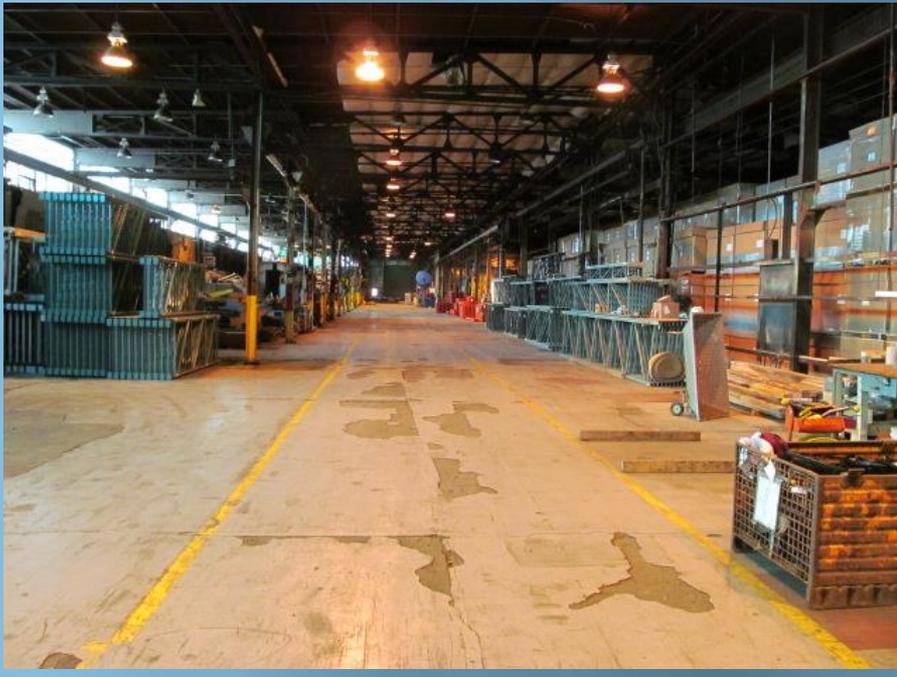


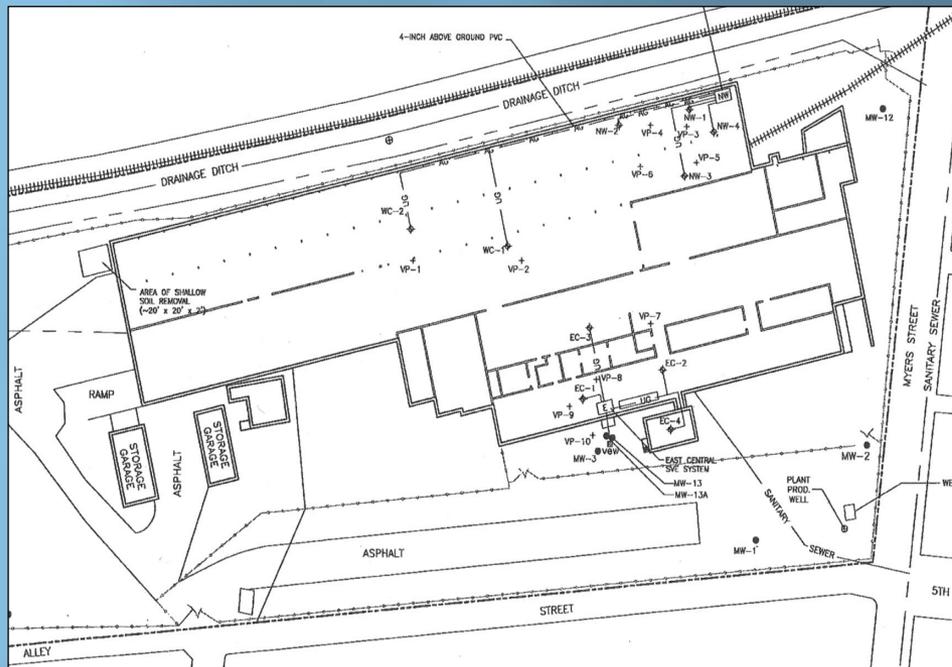
Approx. 80,000 ft<sup>2</sup> manufacturing facility

Various manufacturing activities from before WWII to now

Solvent usage for decades - one of the largest users of TCE in the country

Primary area used for manufacturing





**Two additional side rooms**

# 2 SVE Systems installed in the building



## Main manufacturing room



# Secondary/side finishing room

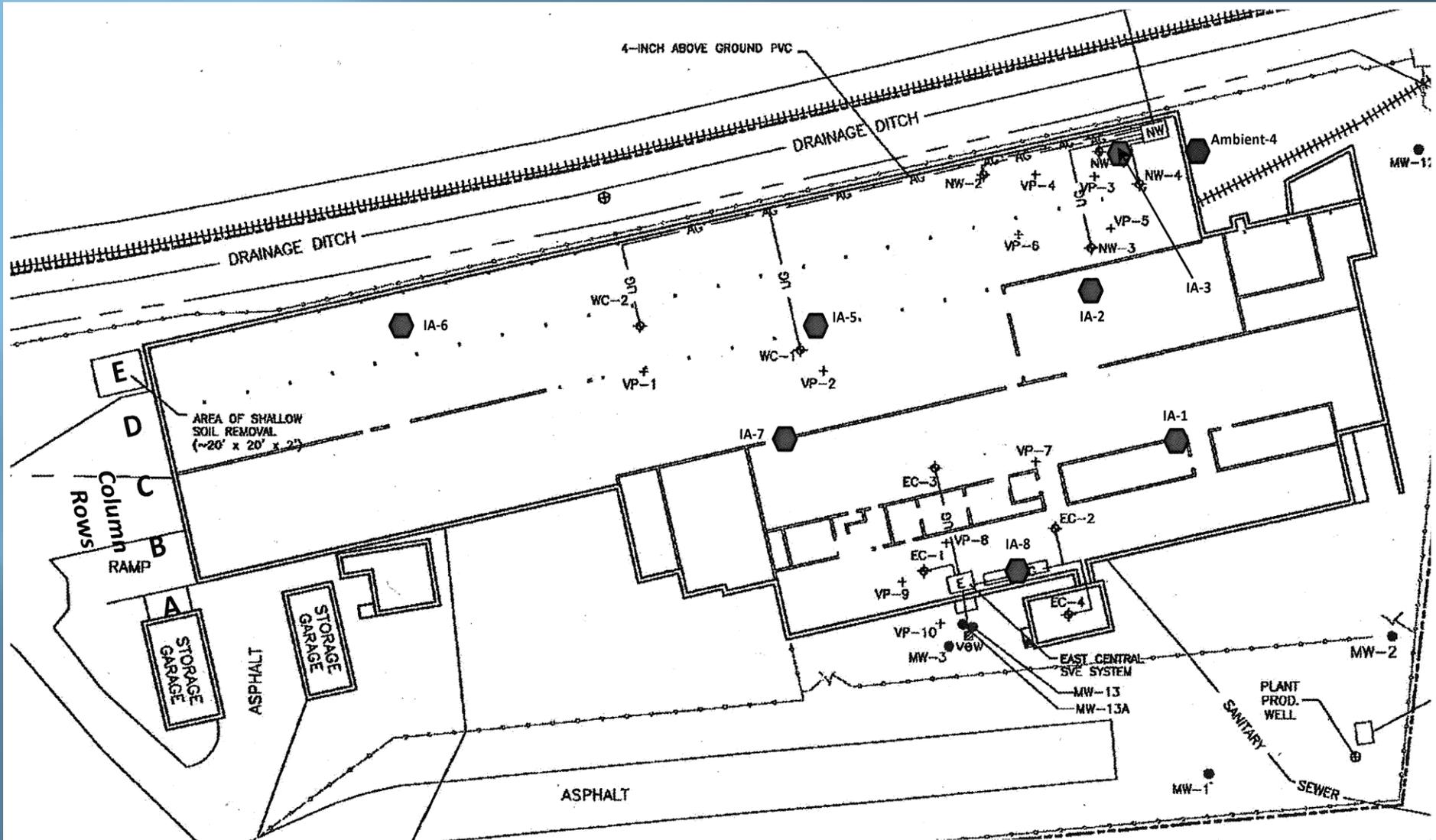


Both systems positioned in areas of known solvent use.

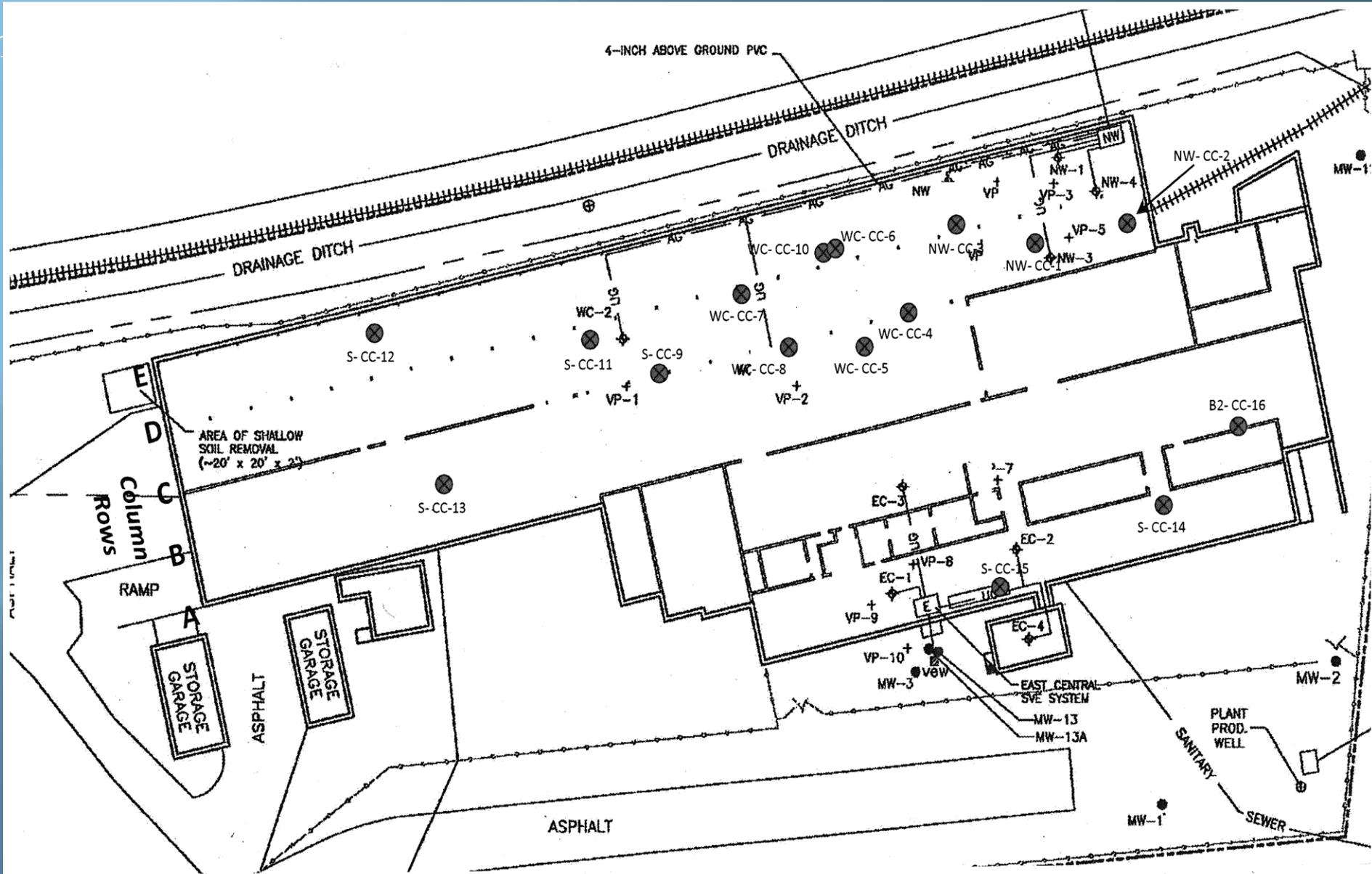




# Indoor Air Sample Locations 7 Indoor + 1 Ambient



# Concrete Chip & Vapor Dome Screening Locations



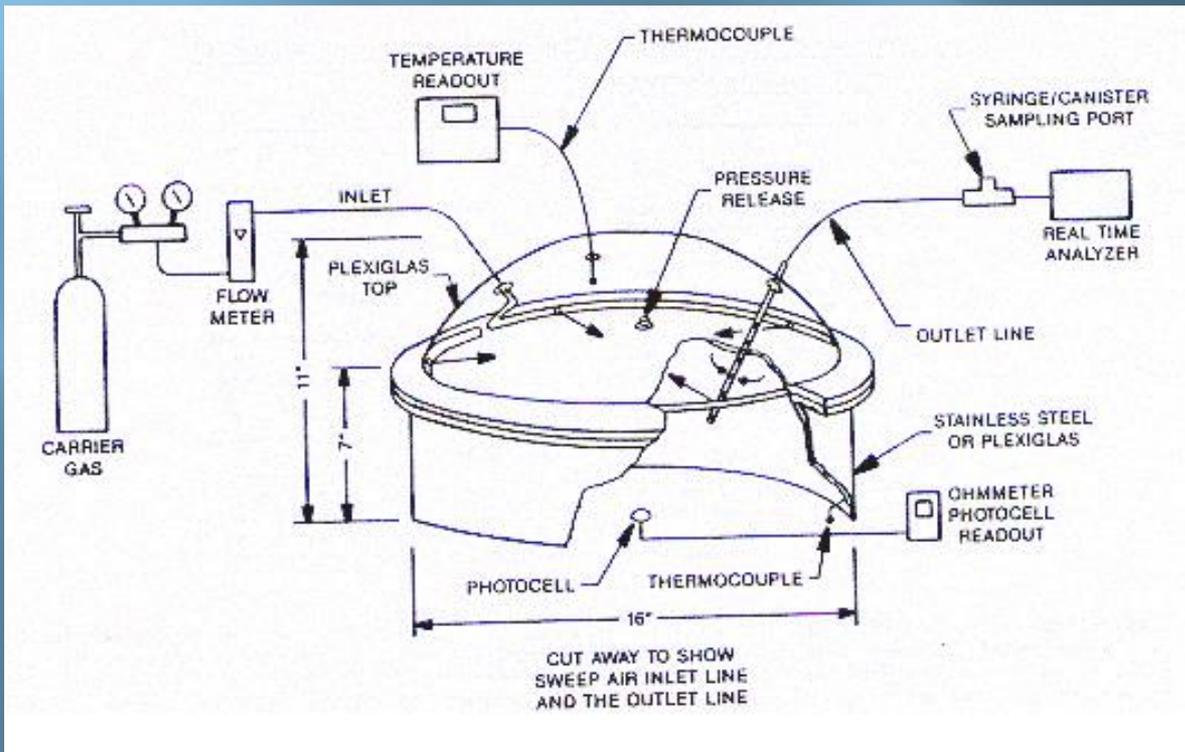
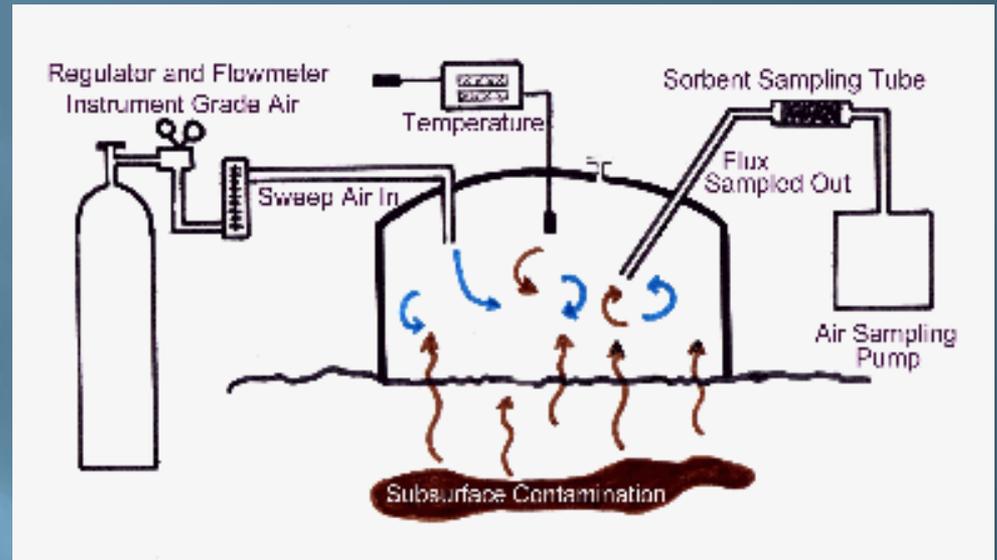
# Concrete Chip & Vapor Dome Sample Screening Process





Photo 2

CE Schmidt

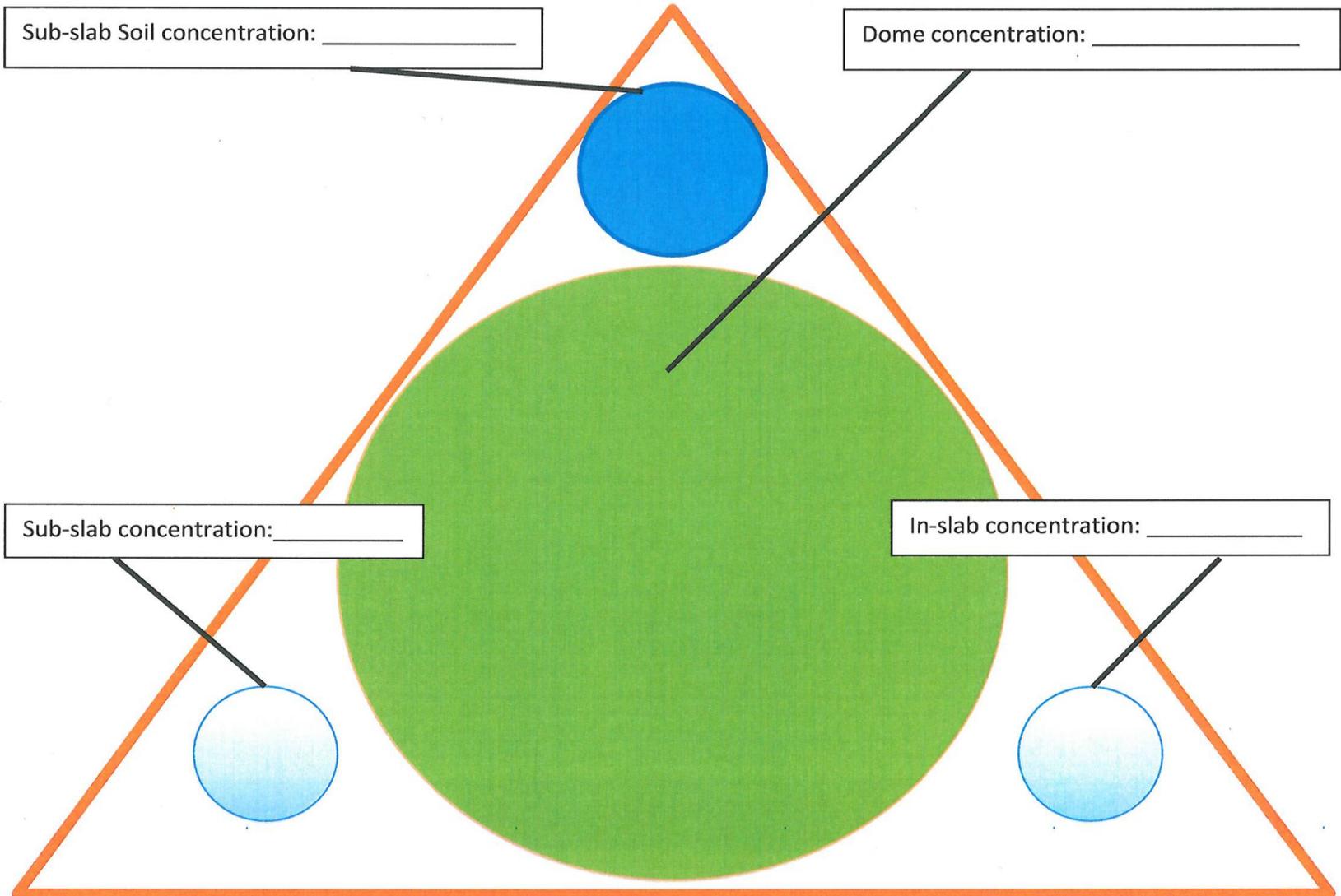


## Flux Chambers

Look Familiar?

Similar Principles

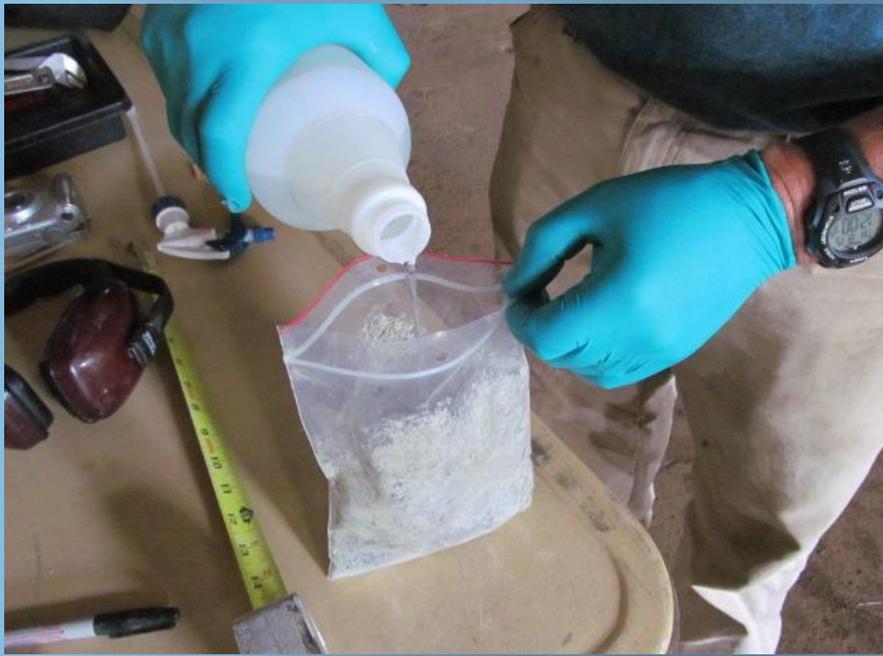
# ~ Conceptual Sample Pattern ~ Qualitative & Quantitative Concrete Evaluation







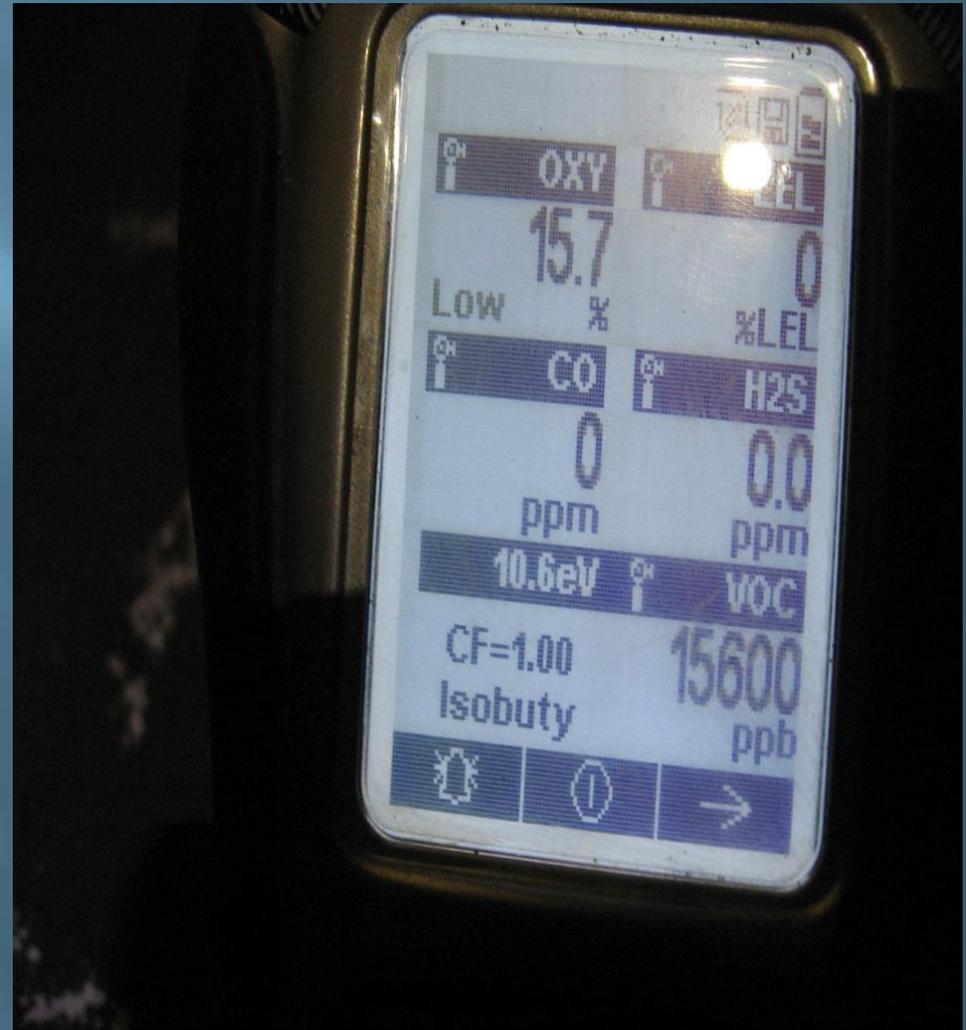






7 ~ 8 hour stabilization period

Direct read instrumentation





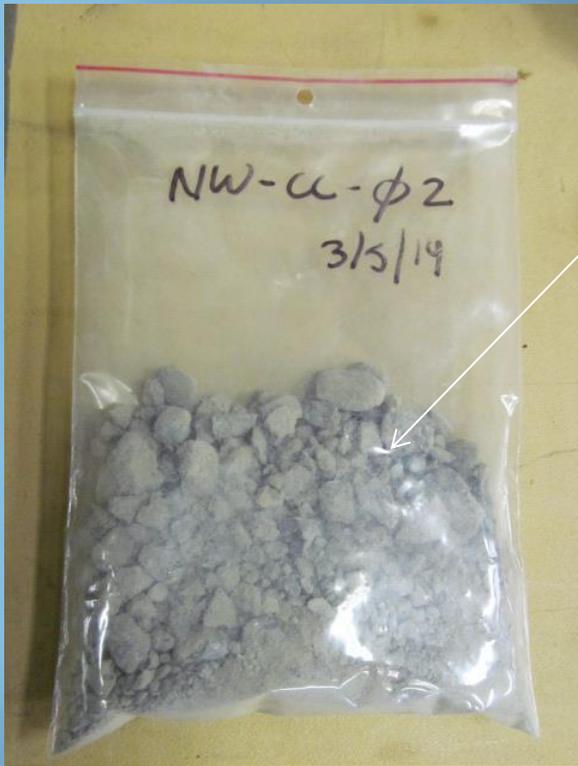
Thermal temp gun used to record temp of concrete



## Sampled concrete chips

Concrete weighed to approx. 100g and placed into 4oz. septa top jars

Vapor Domes sampled into Tedlar Bags for real-time analysis in mobile lab





Additional  
building  
materials  
sampled

Accumulated  
"crud"  
under  
floor tile and near  
machinery



Insulation

Drilling  
concrete dust



# Initial results of Concrete Evaluation/Analysis

| Sample ID  | Sample Date | TCE<br>ug/m <sup>3</sup> | cDCE<br>ug/m <sup>3</sup> | tDCE<br>ug/m <sup>3</sup> | VC<br>ug/m <sup>3</sup> |
|--|-------------|--------------------------|---------------------------|---------------------------|-------------------------|
| <b>Concrete Chip Air</b>                                       |             |                          |                           |                           |                         |
| NW-O-SS-05 (0-2 inches)  | 8/28/2013   | 52,271                   | 94,284                    | ND                        | ND                      |
| NW-O-SS-05 (2-4 inches)  | 8/28/2013   | 20,421                   | 90,596                    | ND                        | ND                      |
| <b>Concrete Chip Shroud</b>                                    |             |                          |                           |                           |                         |
| NW-O-SS-05   | 8/28/2013   | 602                      | ND                        | ND                        | ND                      |
| WC-O-SS-06   | 8/28/2013   | ND                       | 48,569                    | ND                        | ND                      |
| <i>Adjusted USEPA RSL for Industrial Air, ug/m<sup>3</sup></i> |             | 8.8                      | NA                        | 26                        | 28                      |

## Concrete Chip Evaluation Tempertature Variation Results

| Sample ID | Sample Date | TCE 36° F PPBv | TCE 52° F PPBv | TCE 60° F PPBv | TCE 105° F PPBv |
|-----------|-------------|----------------|----------------|----------------|-----------------|
|-----------|-------------|----------------|----------------|----------------|-----------------|

Processed Concrete Chips w/Dust

|              |          |      |      |      |       |
|--------------|----------|------|------|------|-------|
| NW - CC - 02 | 3/4/2014 | 324  | 611  | 605  | 1,200 |
| S-CC-12      | 3/4/2014 | 170  | 318  | 323  | 689   |
| WC-CC-4      | 3/4/2014 | 220  | 403  | 401  | 877   |
| NW-CC-3      | 3/4/2014 | 128  | 244  | 248  | 481   |
| E-CC-14      | 3/4/2014 | 244  | 433  | 440  | 910   |
| WC-CC-06     | 3/4/2014 | 1060 | 2515 | 2726 | 5382  |

### Indoor Air Sample Results - TO 15 Analysis

|           |              |
|-----------|--------------|
| IA - 1    | 7.3 ppbv TCE |
| IA - 2    | 12 ppbv TCE  |
| IA - 3    | 15 ppbv TCE  |
| Ambient-4 | N/D          |
| IA - 5    | 19 ppbv TCE  |
| IA - 6    | 13 ppbv TCE  |
| IA - 7    | 15 ppbv TCE  |
| IA - 8    | 21 ppbv TCE  |

### Vapor Dome Screening Results

|          |                  |
|----------|------------------|
| NW-CC-03 | 1746 ppbv TCE    |
| WC-CC-06 | 784/818 ppbv TCE |
| WC-CC-07 | 395/435 ppbv TCE |
| S-CC-09  | 11,500 ppbv TCE  |
| S-CC-09A | 14,200 ppbv TCE  |
| WC-CC-10 | 173 ppbv TCE     |
| S-CC-12  | 195 ppbv TCE     |
|          |                  |

# CONCLUSIONS

- \* Additional Fixed-based Lab Results Needed
- \* Fixed-base v. Mobile Lab v. Hand-held Screening Comparison
- \* Additional Evaluation of Concrete Chips @ Various Temps
- \* Sample Concrete/Material with a “control” Compound

