

zNose®

**A portable GC used to detect and
analyze odorous compounds**

**Electronic Sensor Technology
Newbury Park, Ca.**

**Odor Evaluation Technical Conference
August 2, 2010**

**Ken Zeiger
email kzeiger@estcal.com**

Who is Electronic Sensor Technology Inc?

Founded in 1995 as LP

A Public Company – 2005 - ESNR

Technology Based on SAW Detection

Registered as zNose®

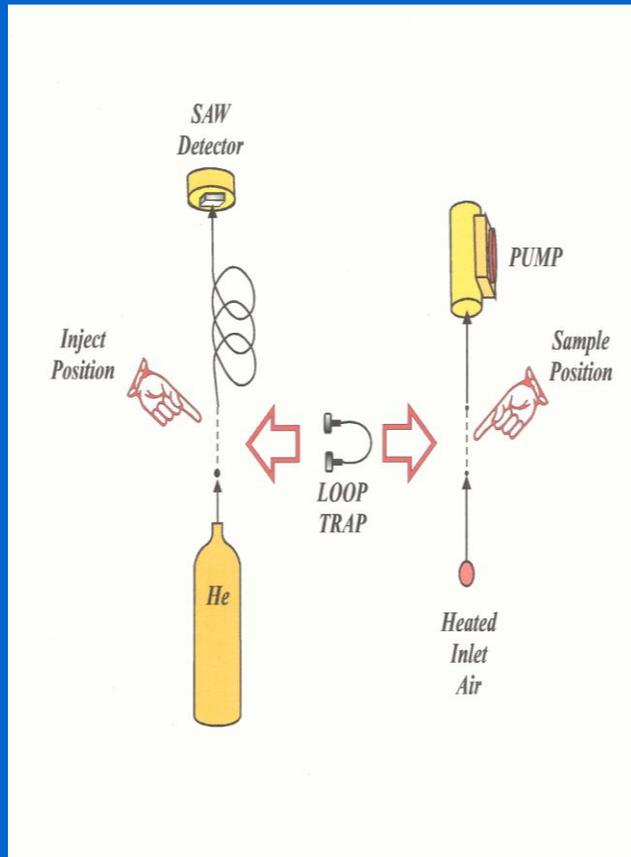
The zNose® is an ultra-fast gas chromatograph with a surface acoustic wave (SAW) detector



Uses GC principles but on a smaller scale.

The electronic nose portion of the zNose™ consists of a SAW detector. SAW detectors are sometimes used in electronic noses to detect airborne VOCs

In the sample mode, the zNose[®] pre-concentrates every sample before analysis



The vapor sample is pre-concentrated onto a Tenax trap through a multi-port valve.

Sampling times are normally programmable from 1-60 seconds.

Very small ($1 <$ microliter) liquid samples can be injected into the system

Setting the method

METHOD ... ram Files\MicroSense\Method Files\10ps-2a1b_60.mth

File Close

Column Temperature Profile

Time (min)	Temperature (°C)
0.0	40
14.0	40
14.0	200
34.0	200
34.0	40
64.0	40

Check Rules

Temp Test

Description

10ps-2a1b_60.mth
10 deg/sec
40-180 deg

Initial Settings: (C)

Sensor	Column	Valve	Inlet	Trap	Flow (ccm)
60	40	165	200	250	3.0

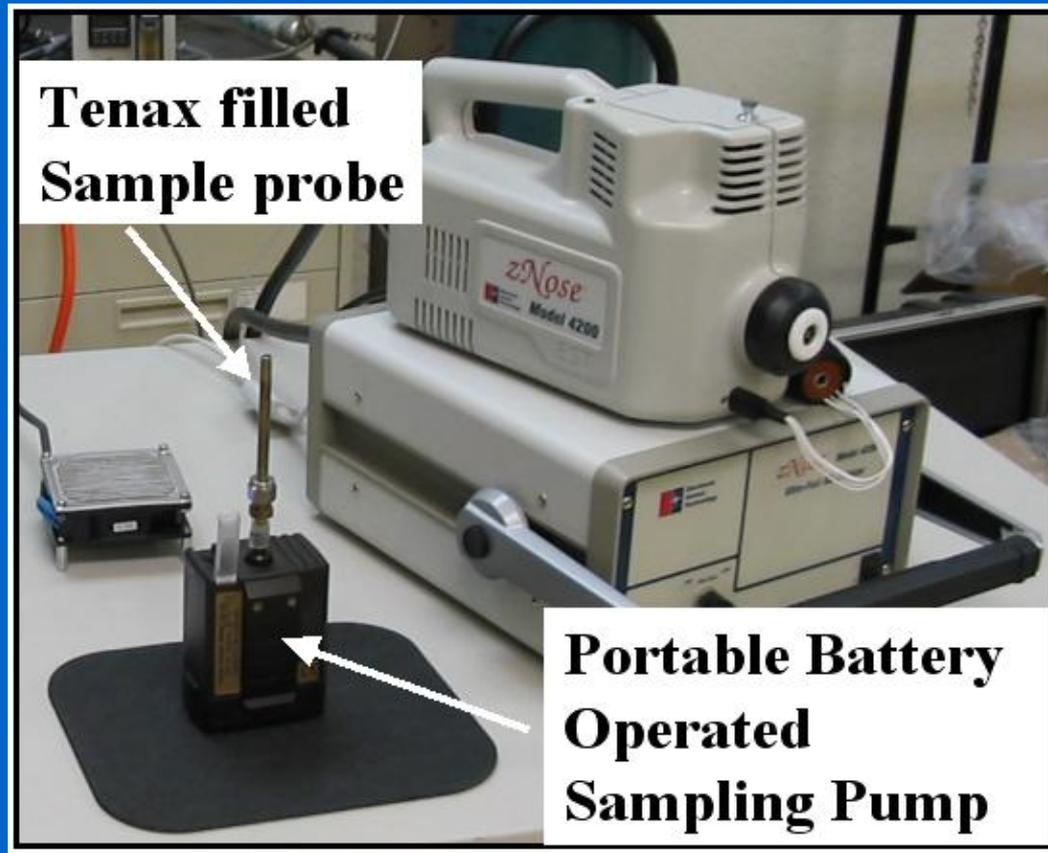
0.0 0.5 10.5 11.0 13.0 13.0 14.0 14.0 34.0 64.0

Icons: PUMP, INJECT, SAMPLE, WAIT, FOCUS, RAMP, DATA, BAKE, FAN, SAMPLE, PUMP, INJECT, WAIT, FOCUS, WAIT, RAMP, DATA, BAKE, END

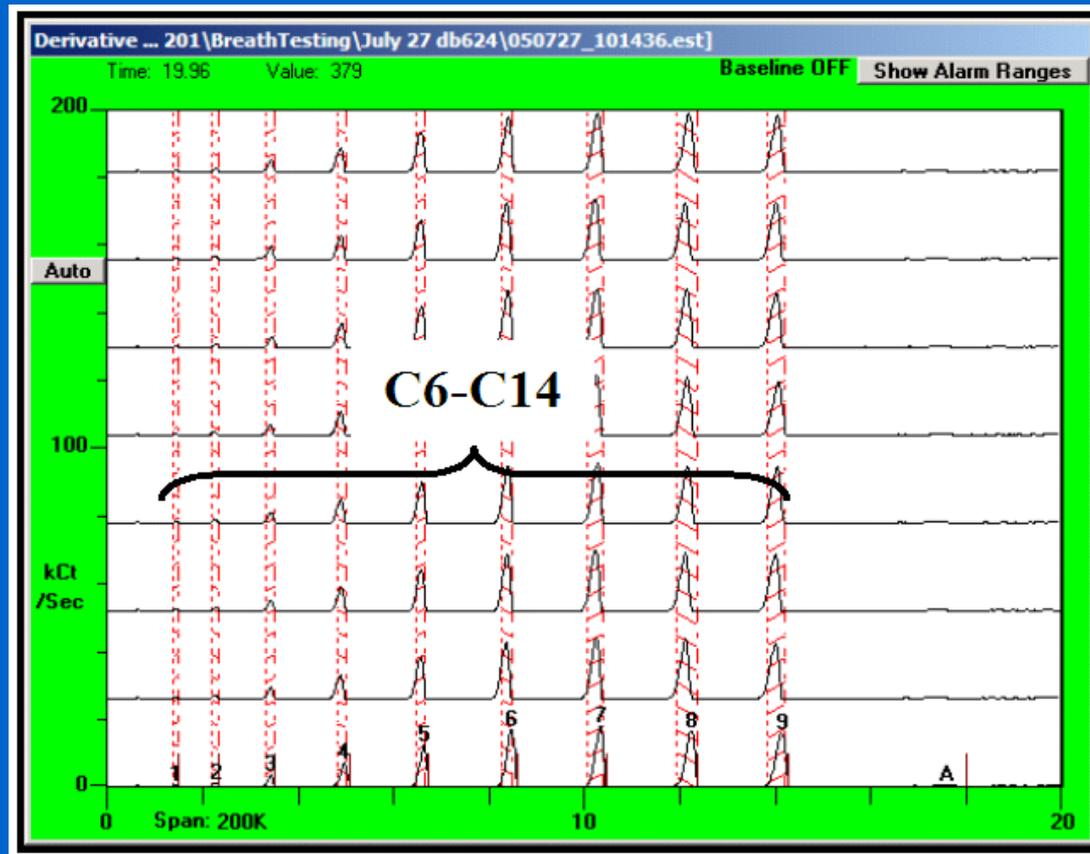
Odor Evaluation Applications

- Foundry Detailed Analysis
- Rendering Plant Testing
- Phenol Analysis

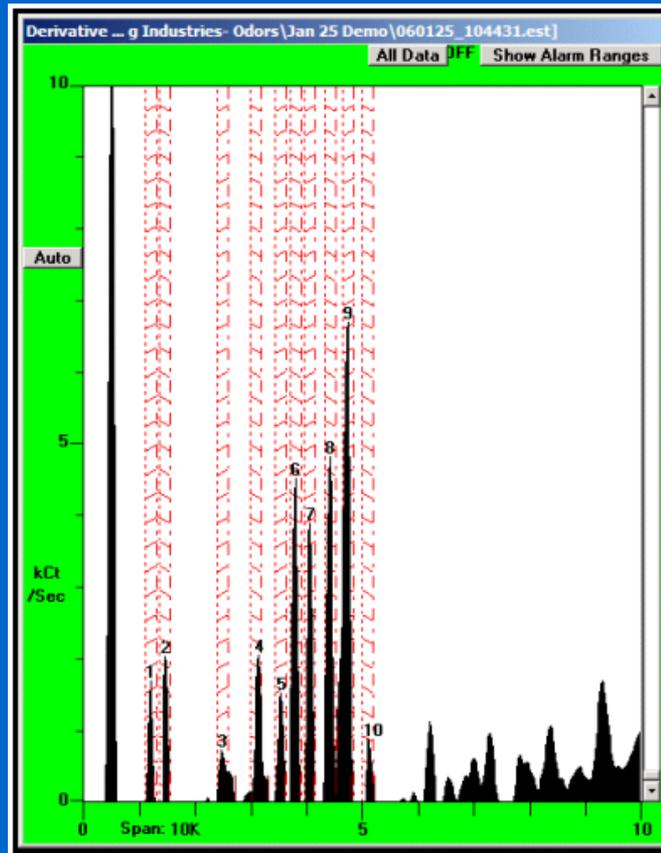
Equipment used in Foundry Analysis



Calibrating with n-Alkanes



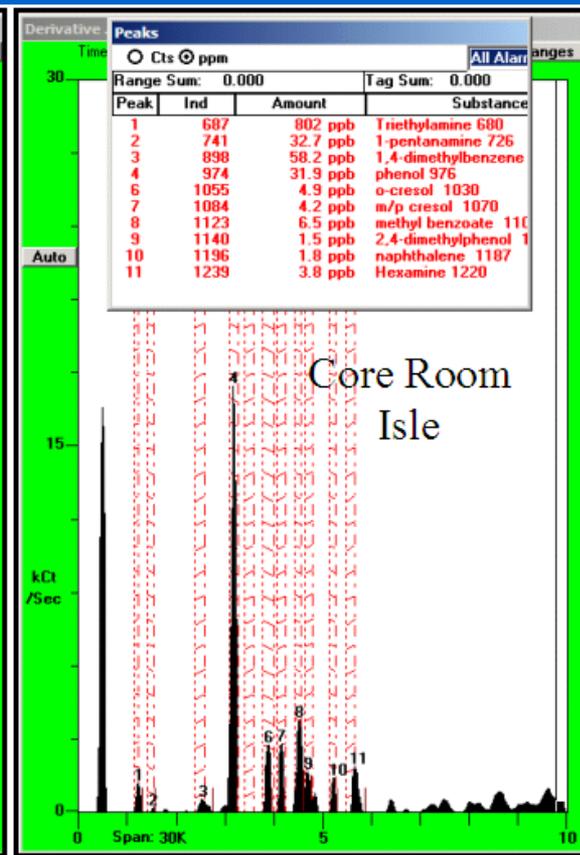
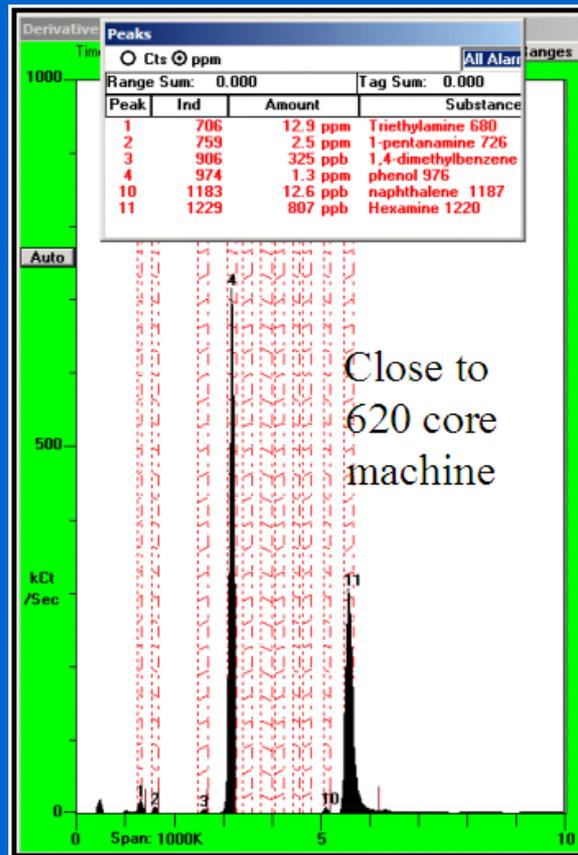
Foundry Analysis core measurements



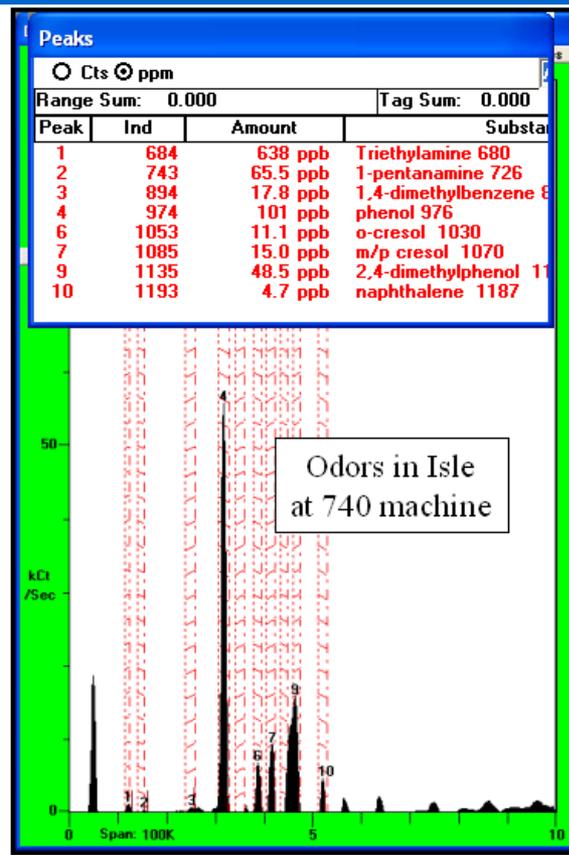
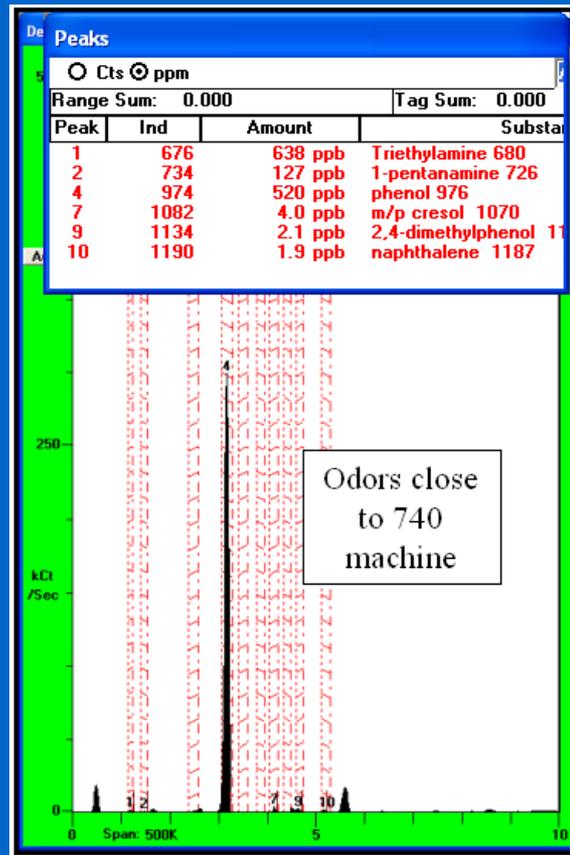
Peaks			
<input type="radio"/> Cts <input checked="" type="radio"/> ppm			All Alarms
Range Sum: 0.000		Tag Sum: 76.673	
Peak	Ind	Amount	Substance
1	679	126 cts	odor 679
2	731	146 cts	odor 731
3	889	132 cts	odor 889
4	969	232 cts	odor 969
5	1015	148 cts	odor 1015
6	1044	456 cts	odor 1044
7	1073	344 cts	odor 1073
8	1111	497 cts	odor 1111
9	1145	76.7 ppm	odor 1145
10	1182	70 cts	odor 1182

Peaks			
<input type="radio"/> Cts <input checked="" type="radio"/> ppm			All Alarms
Range Sum: 0.000		Tag Sum: 0.000	
Peak	Ind	Amount	Substance
1	679	981 ppb	Triethylamine 680
2	731	531 ppb	1-pentanamine 726
3	889	35.5 ppb	1,4-dimethylbenzene 875
4	969	4.4 ppb	phenol 976
5	1015	2.7 ppb	phenylethanol 1005
6	1044	8.1 ppb	o-cresol 1030
7	1073	6.1 ppb	m/p cresol 1070
8	1111	8.4 ppb	methyl benzoate 1105
9	1145	14.9 ppb	2,4-dimethylphenol 1144
10	1182	1.1 ppb	naphthalene 1187

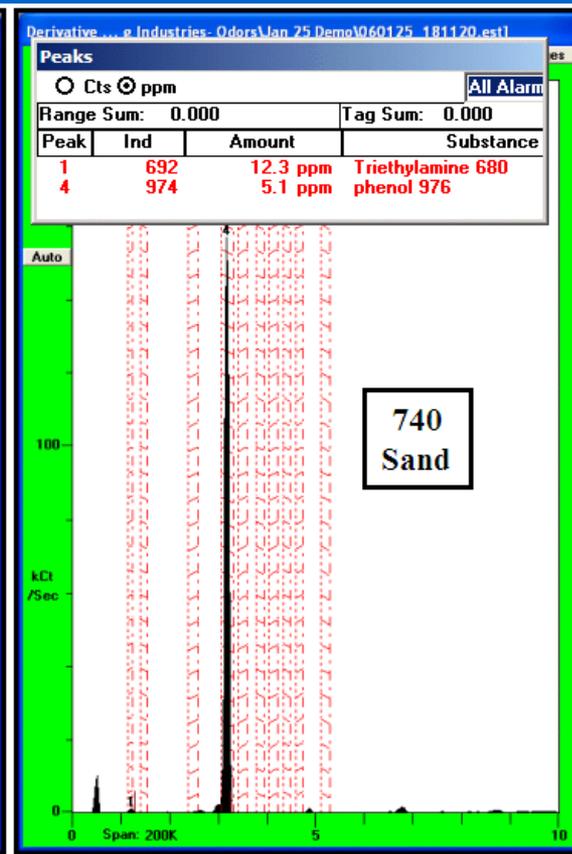
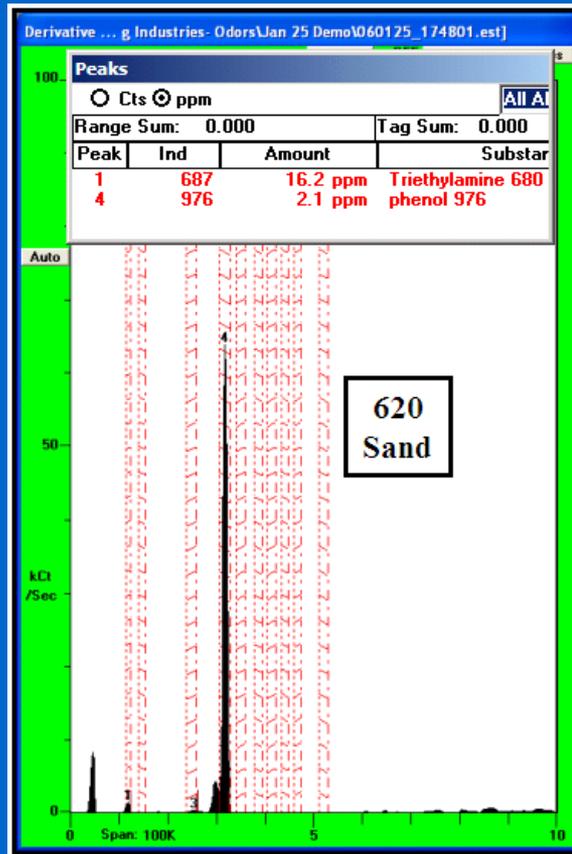
Foundry analysis near 620 Sand Molding Machine



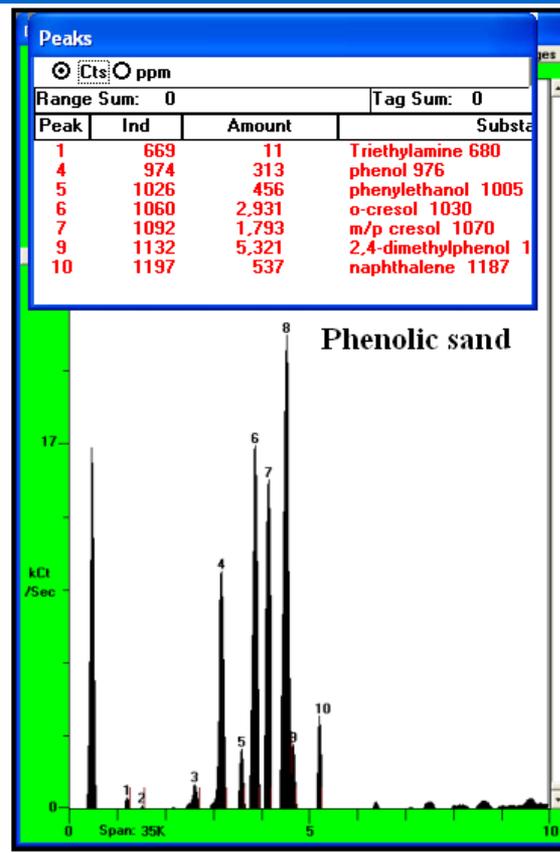
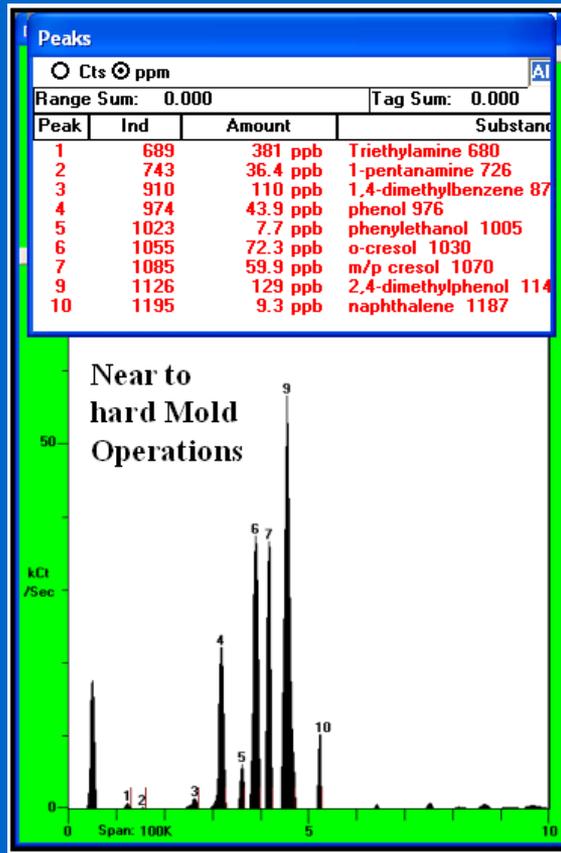
Foundry Analysis Odors near 740 sand machines



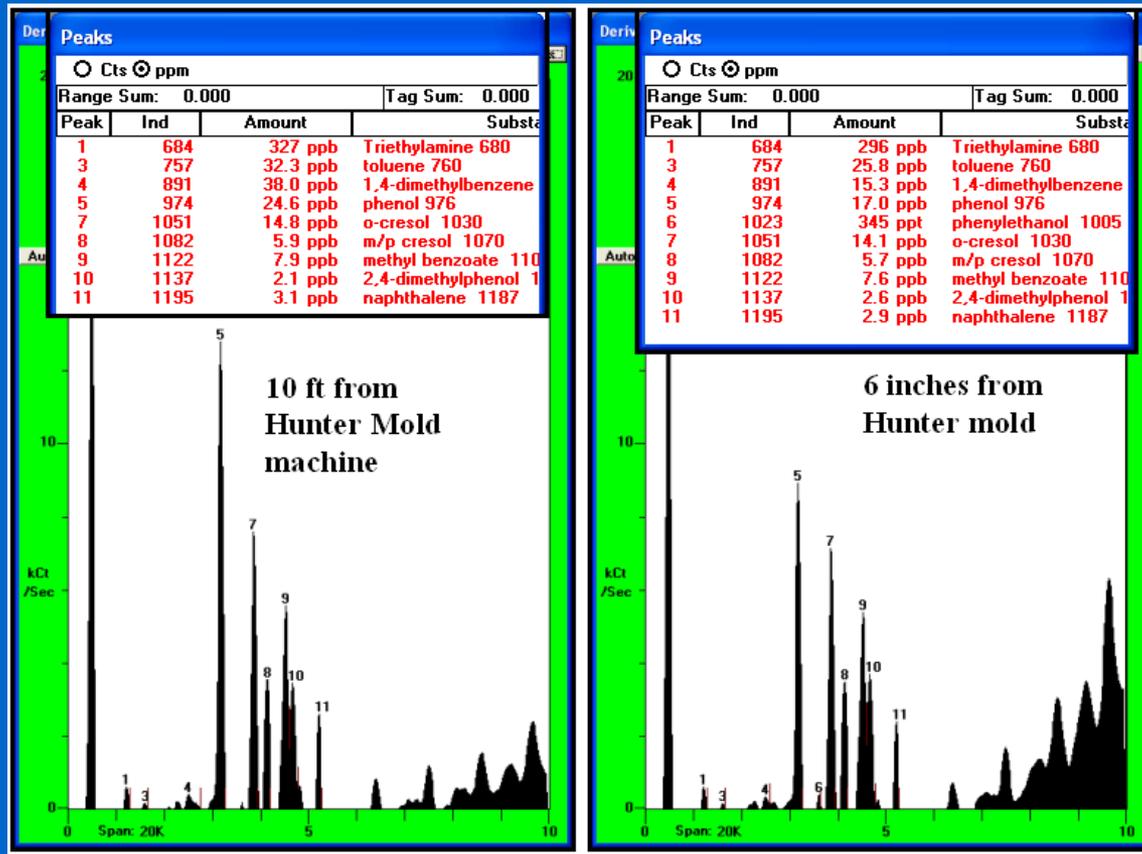
Foundry Analysis of 10 grams of sand from each location in 40 ml vial



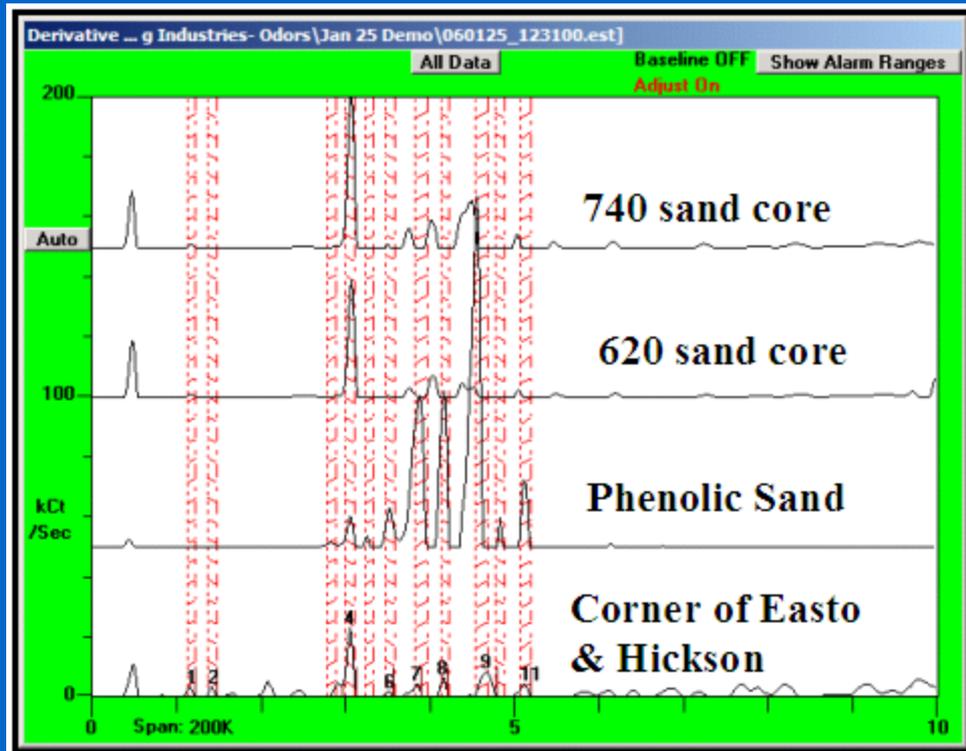
Foundry Analysis ambient air near hard molding machine vs sand samples



Foundry Analysis Hunter mold machine vs actual measurement near part

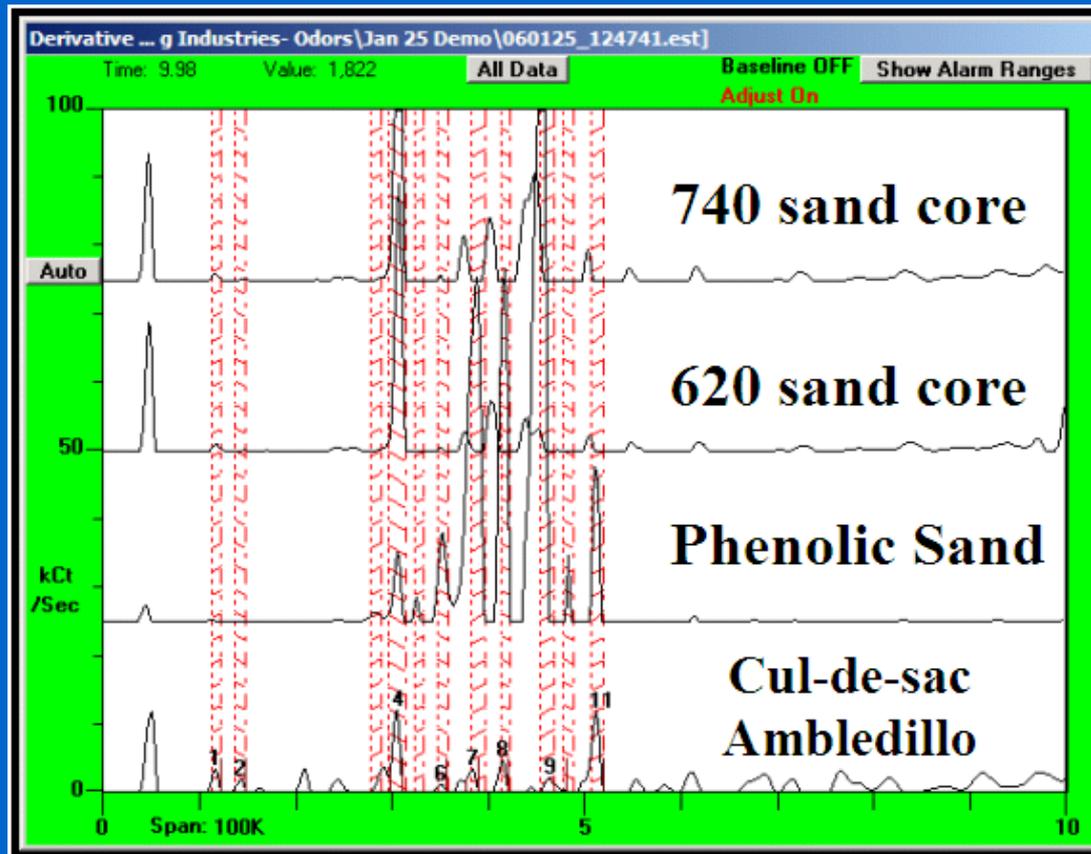


Foundry Analysis neighborhood measurements



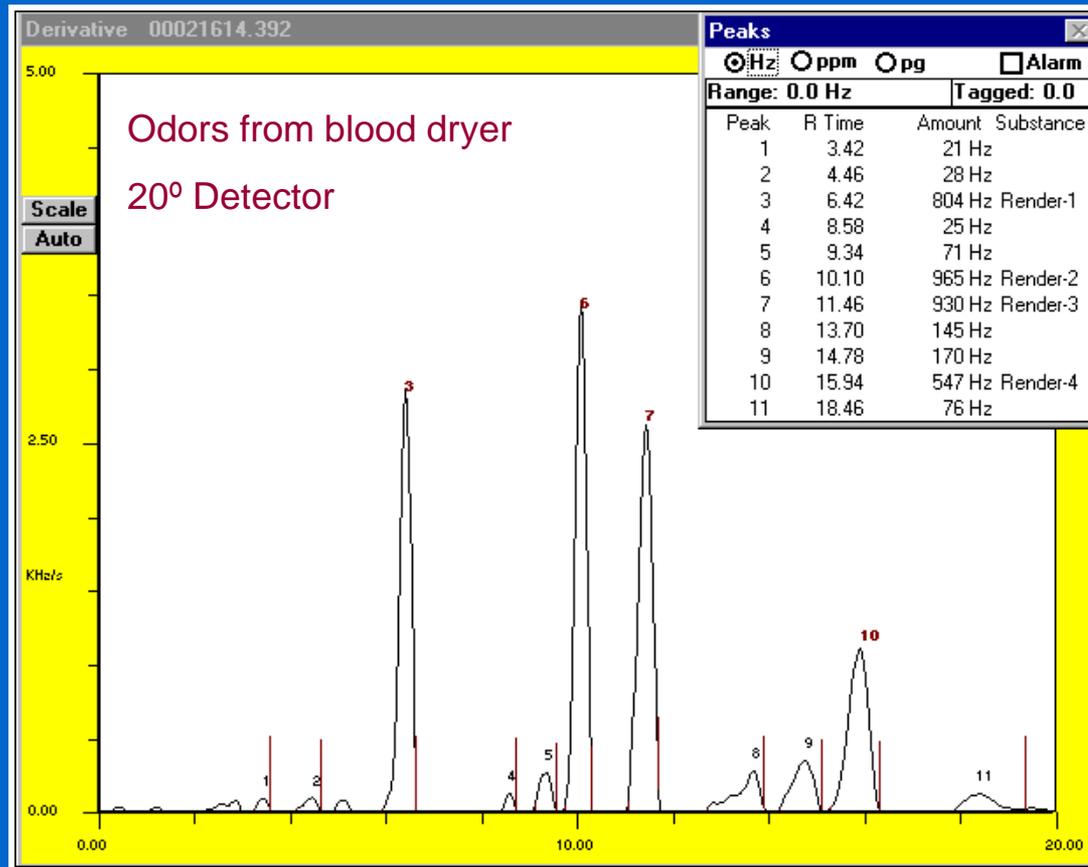
Peaks				
		<input type="radio"/> Cts	<input checked="" type="radio"/> ppm	<input type="button" value="All Alk"/>
Range Sum: 0.000			Tag Sum: 0.000	
Peak	Ind	Amount	Substance	
1	696	13.8 ppb	Triethylamine	
2	743	20.5 ppb	1-pentanamine	
4	976	252 ppt	phenol 976	
6	1032	12.5 ppt	dimethyl succinate	
7	1068	61.7 ppt	m/p cresol 1075	
8	1104	64.9 ppt	methyl benzoate 1	
9	1156	154 ppt	2,4-dimethylphenol	
11	1205	53.7 ppt	Hexamine	

Foundry measurements in Cul-de-sac

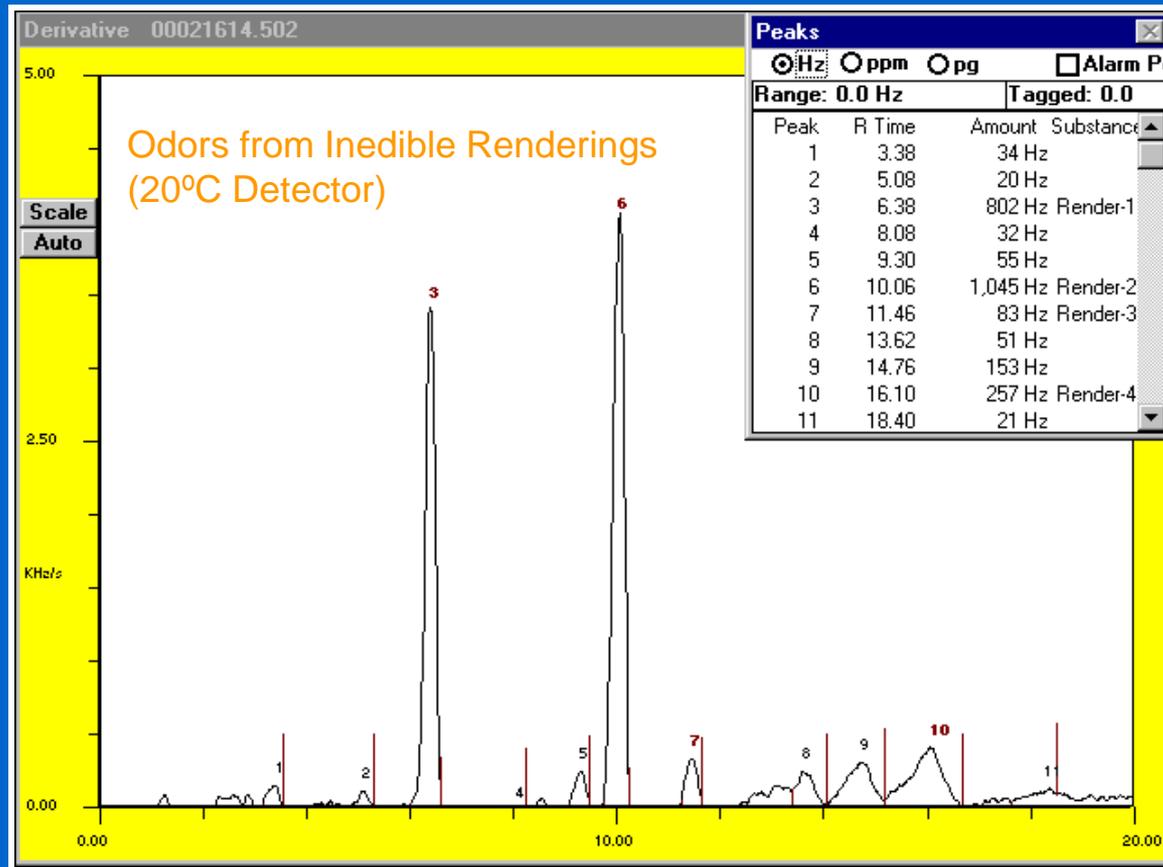


Peaks				
		<input type="radio"/> Cts	<input checked="" type="radio"/> ppm	<input type="button" value="All Alk"/>
Range Sum:		0.000		Tag Sum: 0.000
Peak	Ind	Amount	Substance	
1	695	14.7 ppb	Triethylamine	
2	742	12.0 ppb	1-pentanamine	
4	977	115 ppt	phenol 976	
6	1030	10.0 ppt	dimethyl succinate	
7	1068	17.7 ppt	m/p cresol 1075	
8	1104	48.6 ppt	methyl benzoate 1	
9	1154	32.4 ppt	2,4-dimethylphenol	
11	1204	155 ppt	Hexamine	

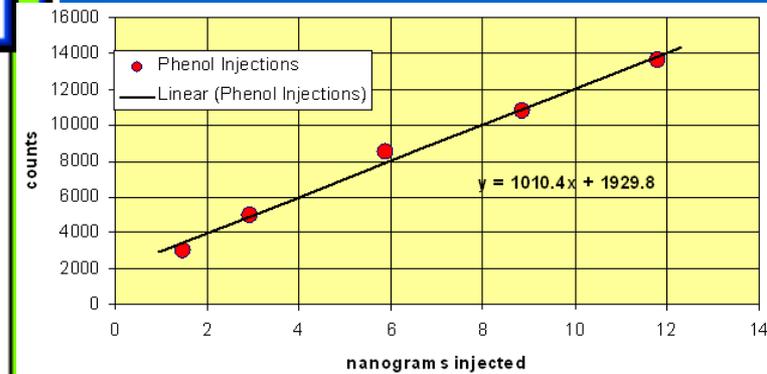
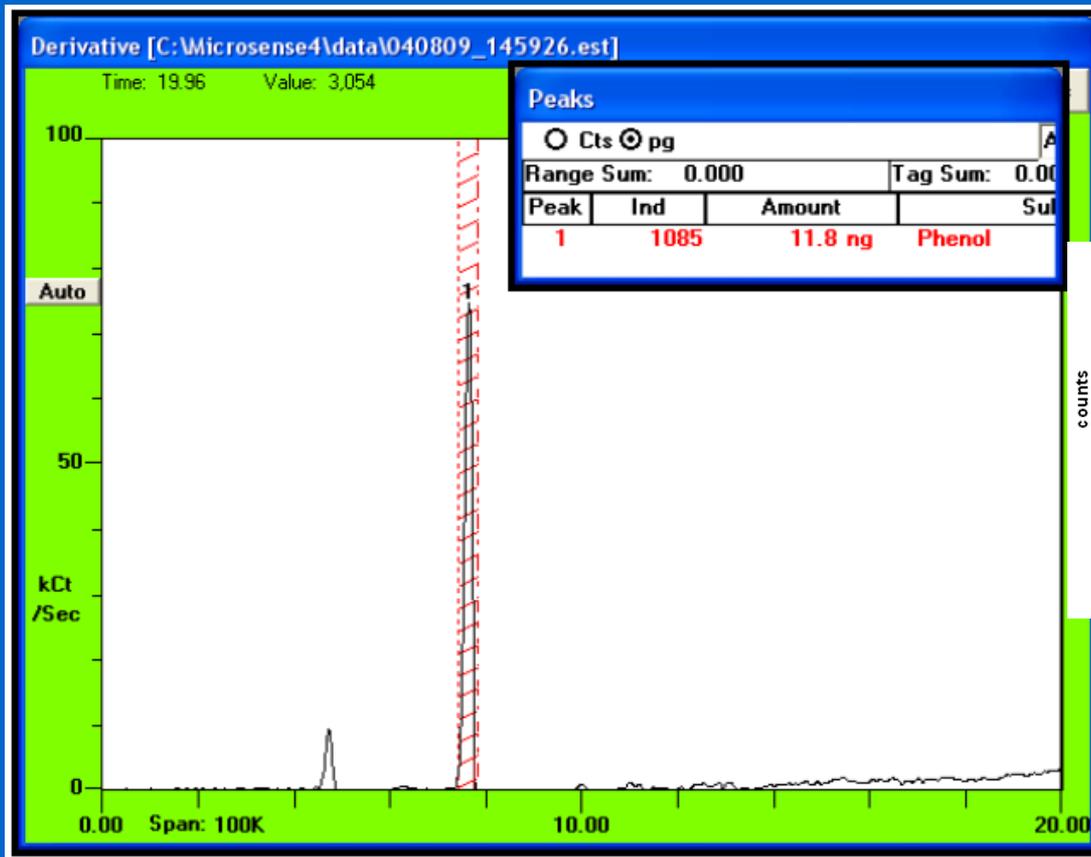
Sample testing of a Rendering Plant



Smells from a Rendering Plant



Phenol Analysis (MDL is estimated at 10 Picograms)



Other zNose® Applications and Conclusions

- Environmental - Air, Soil and Water
- Medical
- Security
- Personal care/Cosmetics
- Other life sciences
- Agriculture
- Food and Beverage Quality Control
- Conclusion - the zNose® has been used successfully in a wide range of applications