

Effects of Background Alcohols on the Analysis of Low Level Volatile Organic Compounds in Air by EPA Method TO-15 While Performing Vapor Intrusion Investigations

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Alcohols - Ethanol

Chemical Information

Chemical Name: Ethanol/SD Alcohol 40

CAS Registry Number: 000064-17-5

Synonyms: Alcohol, ethyl; Denatured alcohol; Distilled spirits; Ethyl alcohol, undenatured; Ethanol; Ethyl alcohol; Methylcarbinol; Bioethanol; grain alcohol; ethyl alcohol; absolute alcohol; aethanol; aethyl alcohol; alcohol; alcohol 200 proof; alcohol anhydrous; alcohol dehydrated; alcohol ethylique; algrain; alkoloh; anhydrol; cologne spirit; etanol; ethyl hydrate; ethyl hydroxide; etylowy alcohol; methyl carbinol; molasses alcohol; potato alcohol; spirits of wine; koncentrat etylowy; mieszanina alkoholu etylowego; etylowy alcohol; alcool ethylique; anydrol; alcohol bruto; alcohol rectificado; alcohol neutron; alcohol destilado; Finsprit 96%; Rasprit 95%; Forløbssprit; spirytus; destylat rolniczy; destylat; alkohol etylowy; Alcool rectifié extra neutre (REN); alcool brut; alcool brut déshydraté; alcool mauvais gout; alcool bon gout; alcool surfin; alcool carburant (agrocarburant- biocarburant); alcool denature; alcool technique; ethanol; Brut de marc; Lie-Eaux de vie; Flegmes de marcs pour la biocarburant; Distillats de marcs; ethyl hydroxid; 200-T1-screenwash; Bio Ethanol 99; Technical Ethanol 96; 49% Technical Ethanol Ethanol 96; Technischer Ethanol; Technischer Ethanol 96; Alcool Rectifié Extra neutre (REN; Alcool Brut; Alcool Brut déshydraté; Alcool ethylique; Alcool Mauvais Goût; Alcool Bon gout; Alcool Surfin; Flegmes; Alcool ethylique déshydraté; Alcool Industriel; Biocarburant; Ethanol carburant; Bio ethanol; Agrocarburant; Alcool denature; Alcool carburant; Alcool technique; potatoe alcohol; etylovy alcohol; Alkohol; Fuel ethanol; Anhydrous alcohol; Absolute ethanol; Aethanol; Aethylalkohol; Alcohol; Alcohol (ethyl alcohol); Alcohol dehydrated; Alcohol; anhydrous; Alcool etílico; Algrain; Alkohol etylowy; Anhydrol; Cologne Spirit



> 1000 products Concentration Range <1.0% to > 60%
<http://householdproducts.nlm.nih.gov/>
<http://toxnet.nlm.nih.gov/cgi-bin/sis/search>



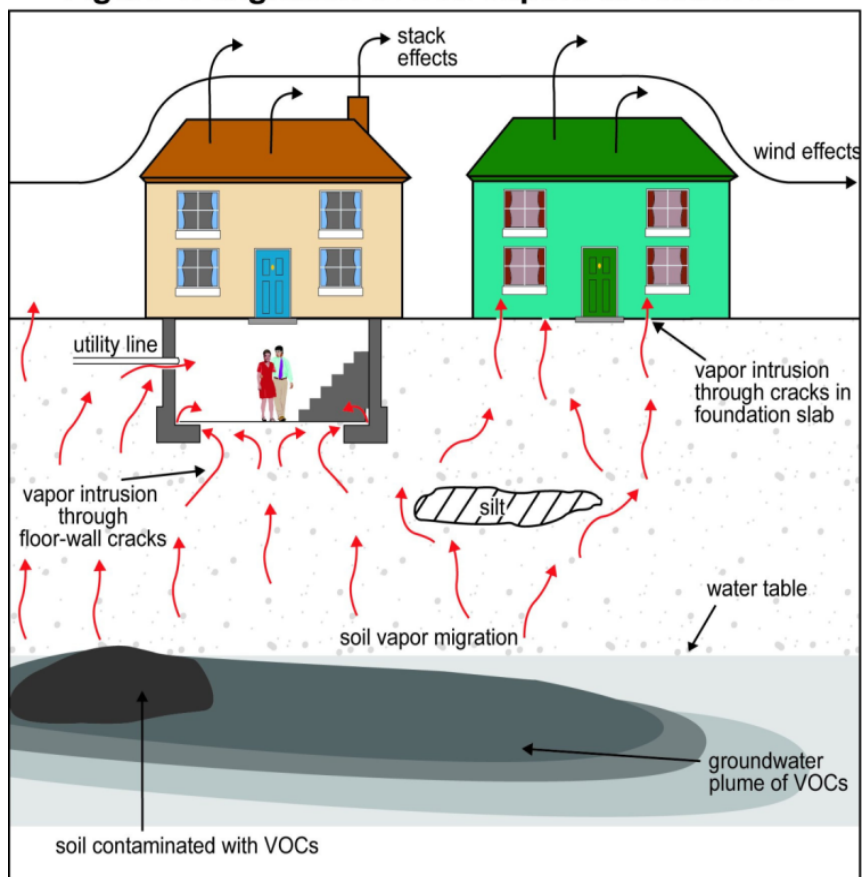
OSHA Exposure

American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) (2009) METHANOL	200 ppm (262 mg/m ³) TWA	HE3	Visual disturbances, optic neuropathy
	250 ppm (328 mg/m ³) STEL	HE4	Metabolic acidosis
		HE7	Headache, dizziness Target organs: Brain, central nervous system
	BEI, Skin	HE8	Narcosis Target organs: Brain, central nervous system
		HE16	Sensory irritation Target organs: Eyes, skin, respiratory system
	American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) (2003) ISO-PROPANOL	200 ppm (491 mg/m ³) TWA	HE7
400 ppm (984 mg/m ³) STEL		HE16	Mild eye, nose, and throat irritation
American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) (2009) ETHANOL	1,000 ppm (1,880 mg/m ³) STEL	HE16	Irritation of the upper respiratory tract and eyes
	A3		



Vapor Intrusion

Figure 1. Migration of Soil Vapors to Indoor Air



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



VI Pathway Investigative Strategy

Stage 1: VI Receptor Evaluation

- Assess potential for VI
- Identify receptors

Stage 2: VI Investigation

- Develop and implement VI Investigation
- Evaluate data using applicable screening levels

Stage 3: Mitigation

Stage 4: Operations, Maintenance and Monitoring

Stage 5: Termination

Conceptual
Site Model

Multiple
Lines of Evidence



Decision Points



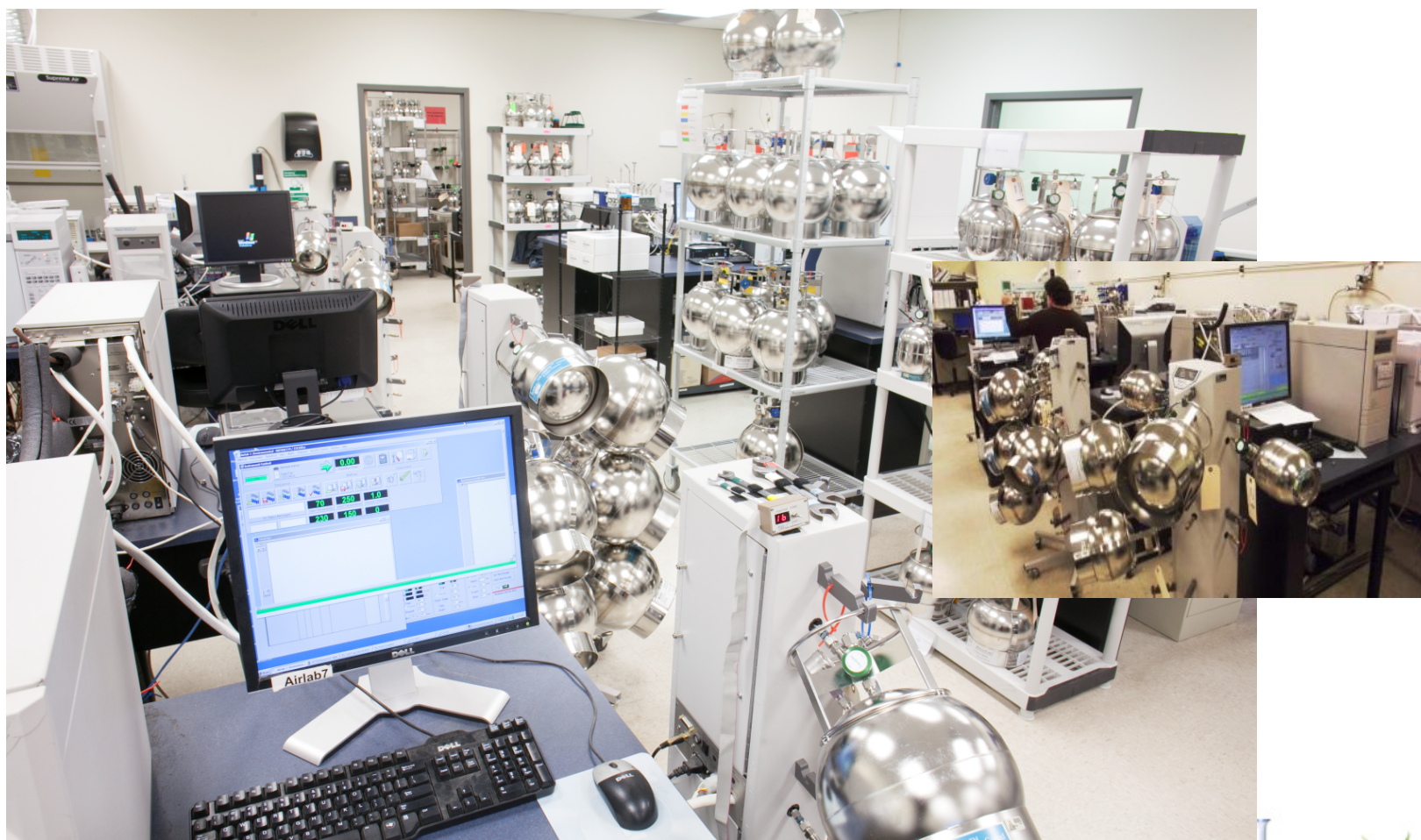
EPA Generic Risk Screening Levels

Contaminant		Carcinogenic Target Risk (TR) = 1E-06	Noncancer Hazard Index (HI) = 0.1
Analyte	CAS No.	Carcinogenic SL TR=1.0E-6 (ug/m ³)	Noncarcinogenic SL HI=0.1 (µg/m ³)
Benzene	71-43-2	0.36	3.10
Ethylbenzene	100-41-4	1.1	100
Methanol	67-56-1		2100
Ethanol Not listed			
Isopropanol	67-63-0		730
Tetrachloroethylene	127-18-4	11	4.2
Trichloroethylene	79-01-6	0.48	0.21



Source EPA Region 3, 6 & 9 Generic VI Screening Tables





Alpha Analytical TO-15 Reporting Limits

COMPOUND	CAS #	Standard Reporting Limit, ppbV	Standard Reporting Limit, ug/m ³	SIM Reporting Limit, ppbV	SIM Reporting Limit, ug/m ³
benzene	71-43-2	0.20	0.64	0.10	0.319
ethylbenzene	100-41-4	0.20	0.87	0.020	0.087
methanol	67-56-1	5.0	6.55	NA	NA
isopropyl alcohol	67-63-0	0.50	1.23	NA	NA
ethanol	64-17-5	2.5	4.71	NA	NA
tetrachloroethene	127-18-4	0.20	1.36	0.020	0.136
trichloroethene	79-01-6	0.20	1.07	0.020	0.107



Various Canisters sizes



1.0 Liter



2.7 Liter



6.0 Liter

Flow Controller FC Configurations



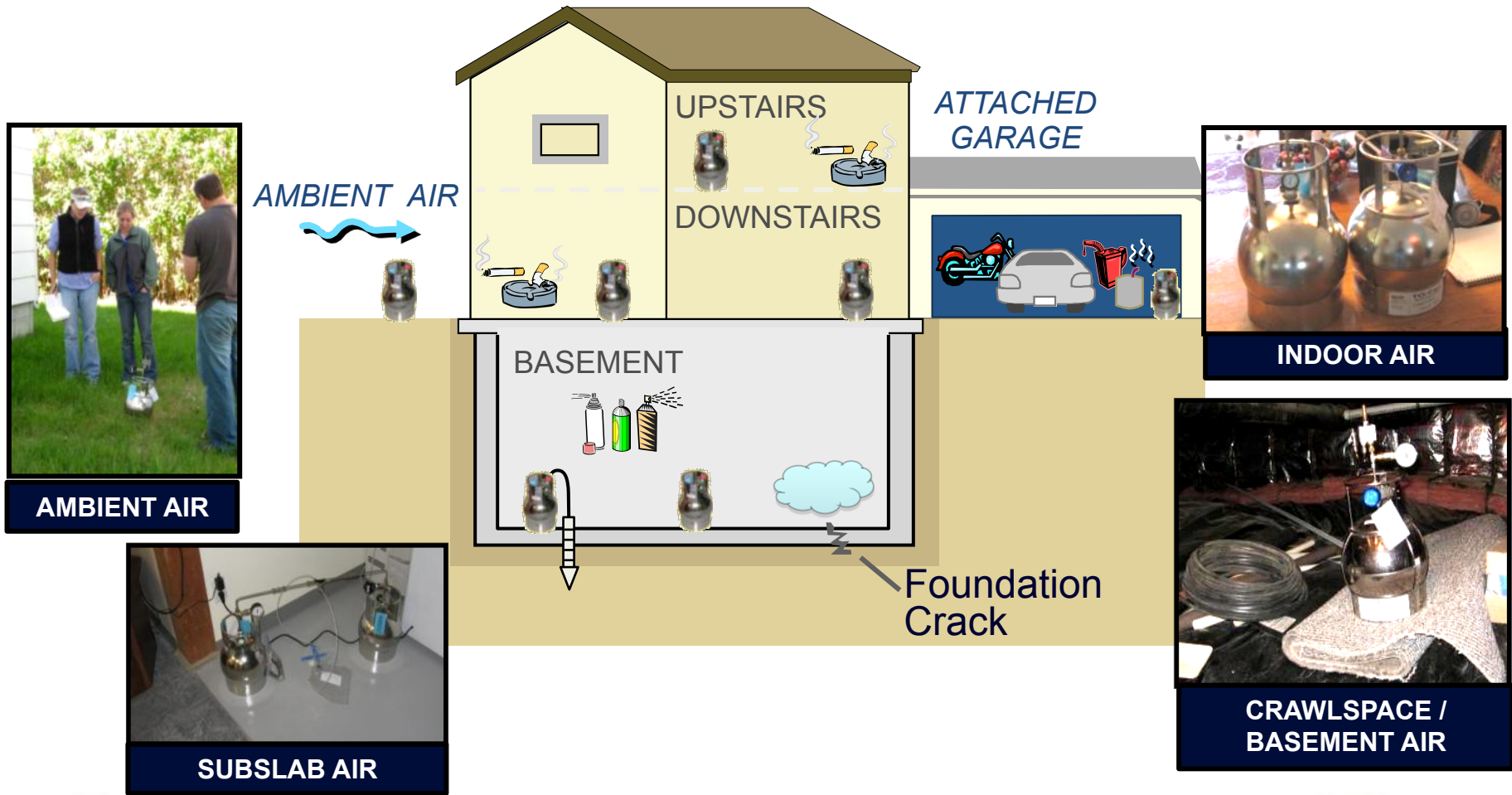
F.C. Soil Vapor



Ambient air F.C.

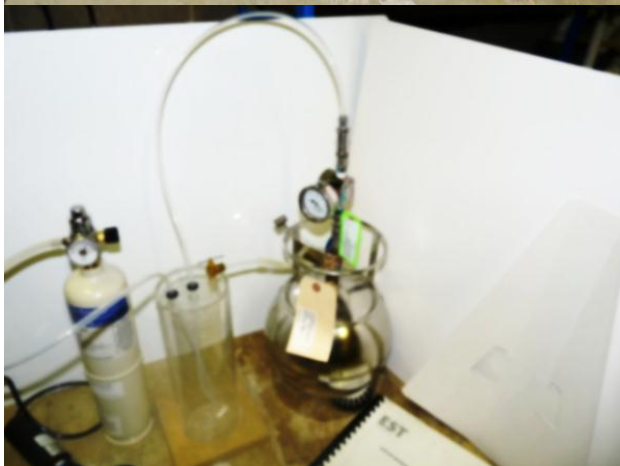


Indoor Air Sampling



Courtesy of Thomas McHugh GSI Environmental Inc.
Battelle Bioremediation Symposium 2011 Reno, Nevada





Verses

**IPA soaked
cloth!
REALLY?**





New Jersey Department of Environmental Protection

**INDOOR AIR BUILDING SURVEY
and SAMPLING FORM**

Preparer's name: _____ Date: _____

Preparer's affiliation: _____ Phone #: _____

Site Name: _____ Case #: _____

Part I - Occupants

Building Address: _____

Building Block: _____ Lot: _____

Property Contact: _____ Owner / Renter / other: _____

Contact's Phone: home () _____ work () _____ cell () _____

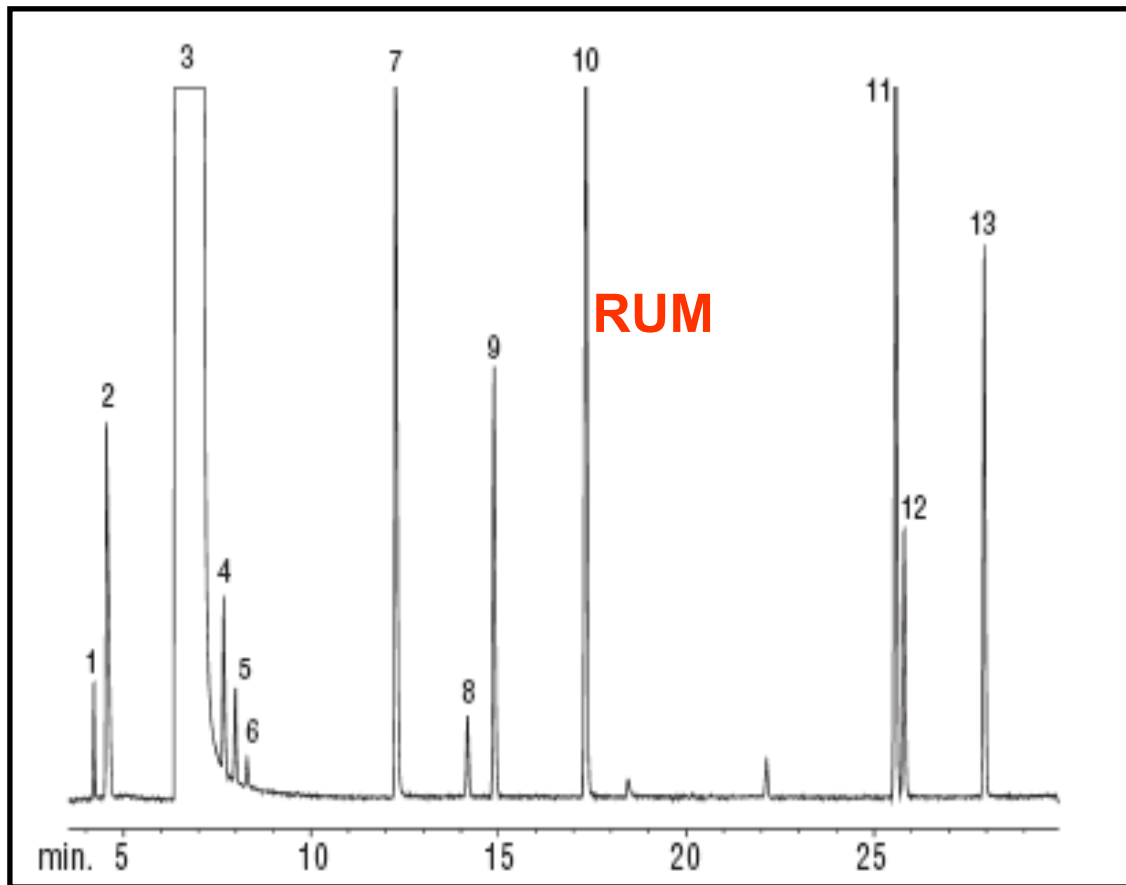
of Building occupants: Children under age 13 ____ Children age 13-18 ____ Adults ____

Challenges of indoor Air Sampling:

- Identify & remove Indoor air VOC sources

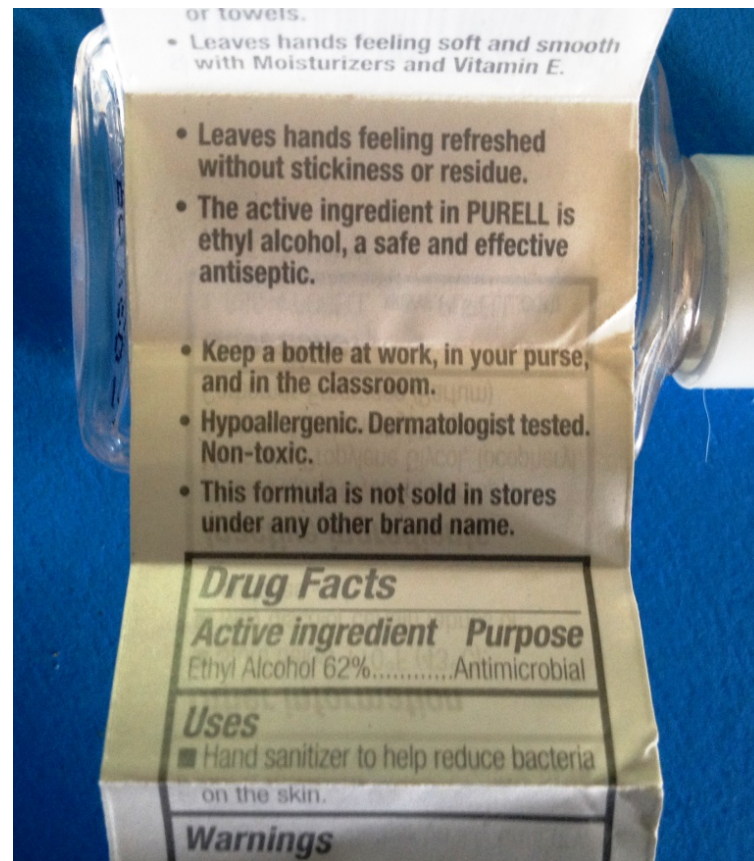


Alcohol Beverages Background Contributors



1. acetaldehyde
2. methanol
- 3. ethanol**
- 4. acetone**
5. ethyl formate
- 6. isopropanol**
7. *n*-propanol
- 8. ethyl acetate**
9. *sec*-butanol
10. isobutanol
11. isoamyl alcohol
12. active amyl alcohol
13. *n*-amyl alcohol





KEEP OUT OF REACH OF CHILDREN

CONTAINS: Methyl Isobutyl Ketone CAS# 108-10-1; Ethyl Acetate CAS# 141-78-6; Rubber Solvent CAS#8006-61-9; Ethyl Alcohol CAS# 64-17-5; Methyl Alcohol CAS# 67-56-1.

V.O.C.: Volatile Organic Content less than 815 grams per liter.

VAPOR PRESSURE: mmHg 50.0

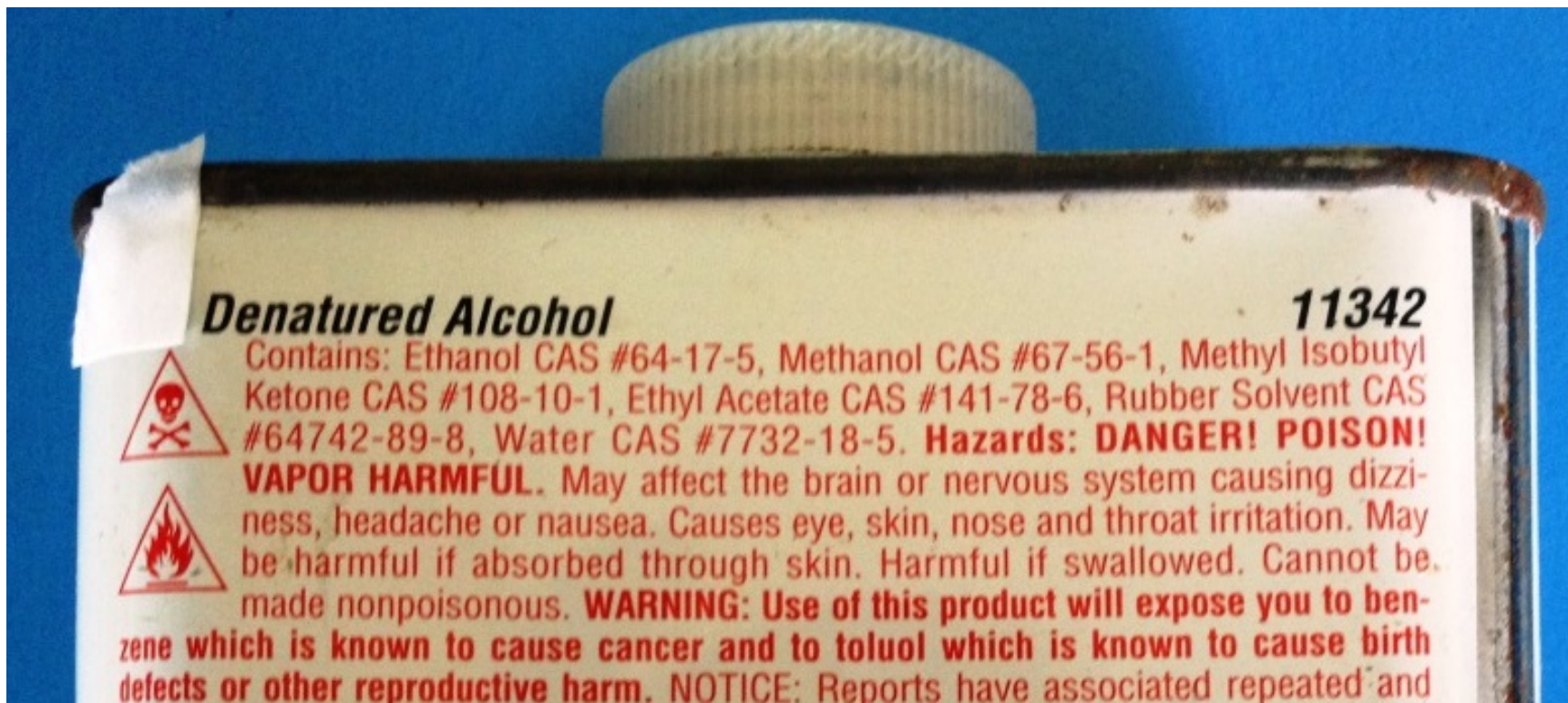
WARNING: This product contains a chemical known to the State of California to cause cancer.

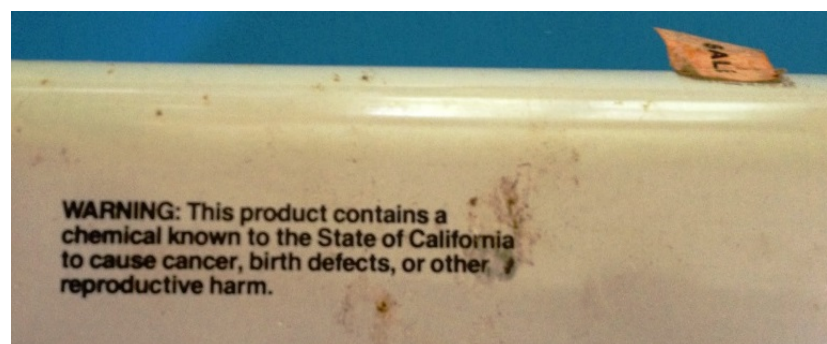
NOTE: If you are using this product in the workplace, read the Material Safety Data Sheet before using.

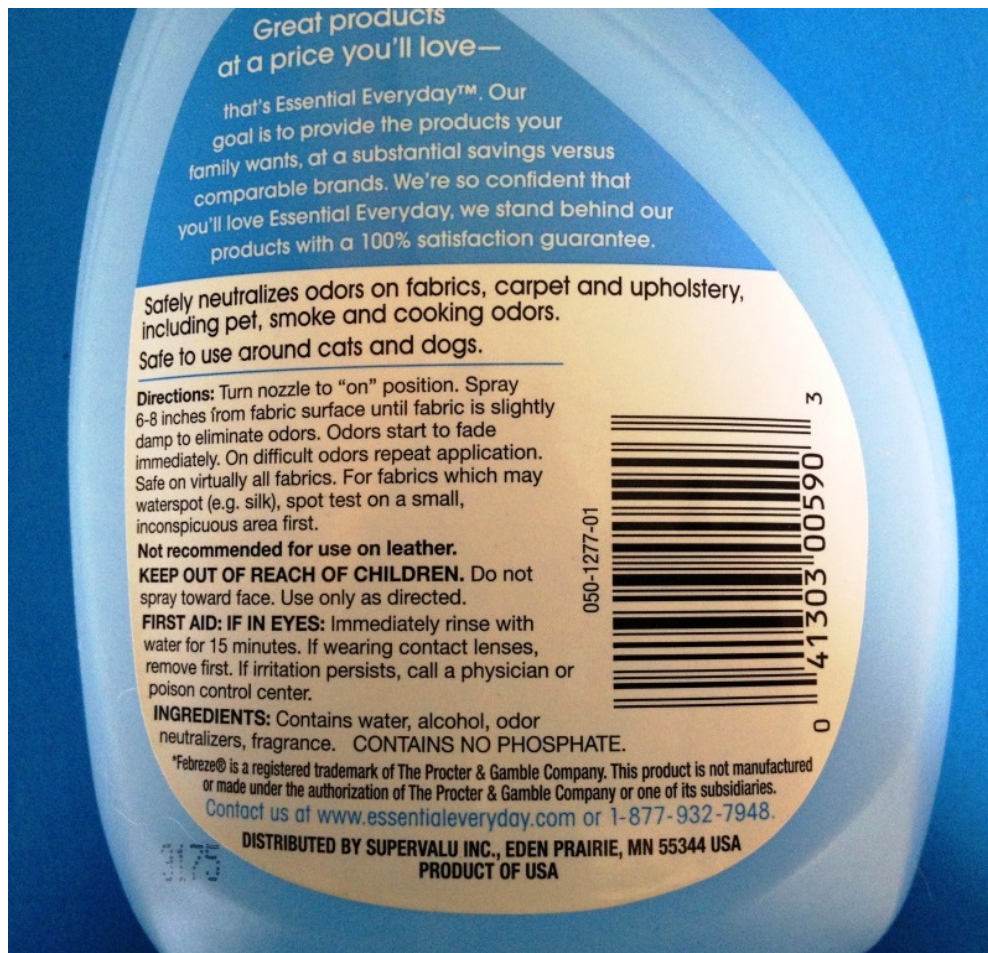
Manufactured in the U.S.A. for
Ace Hardware Corporation
Oak Brook, IL 60521 U.S.A. 6185 P893 SGI993

03/24/95 19:29:51





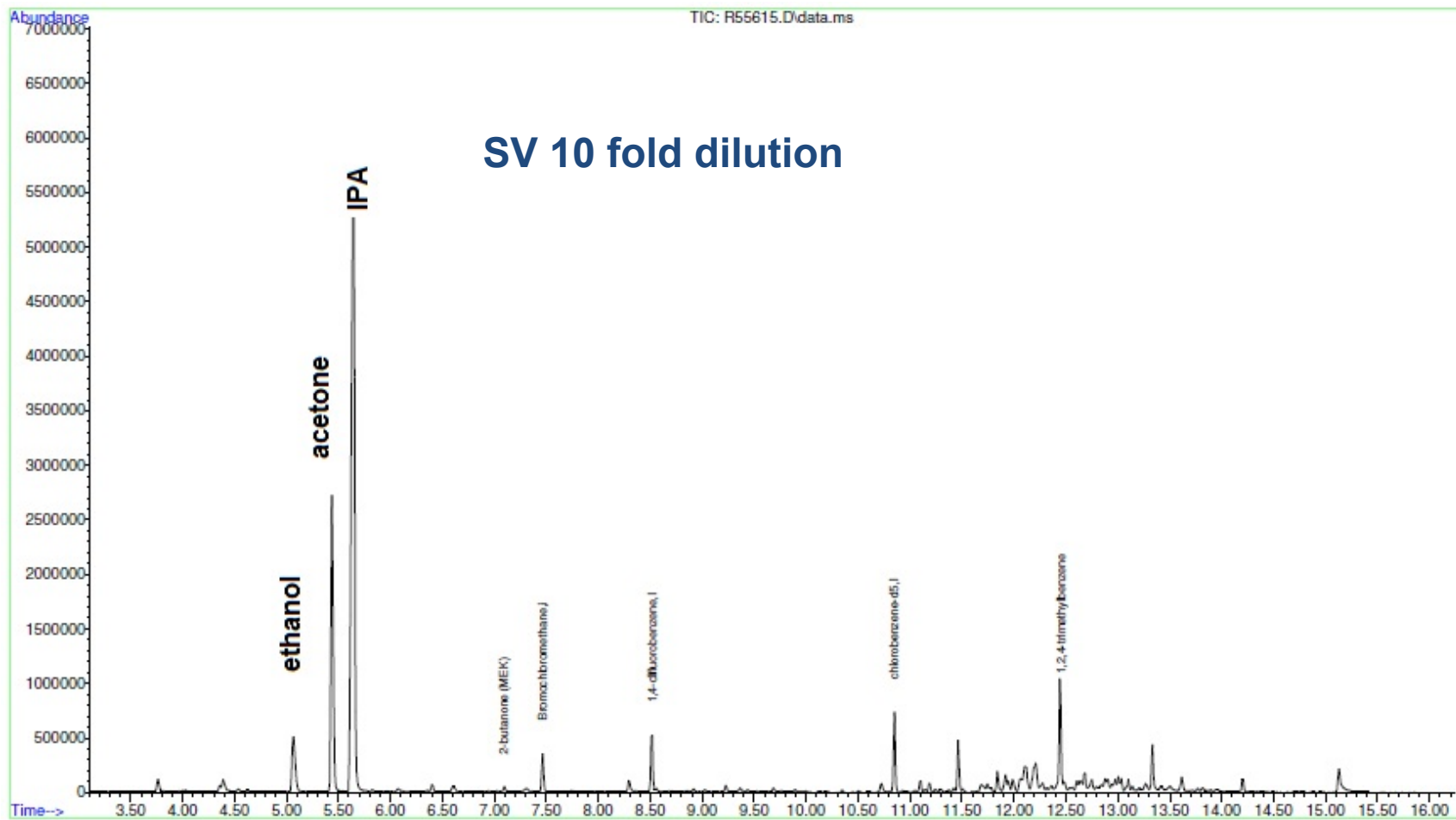


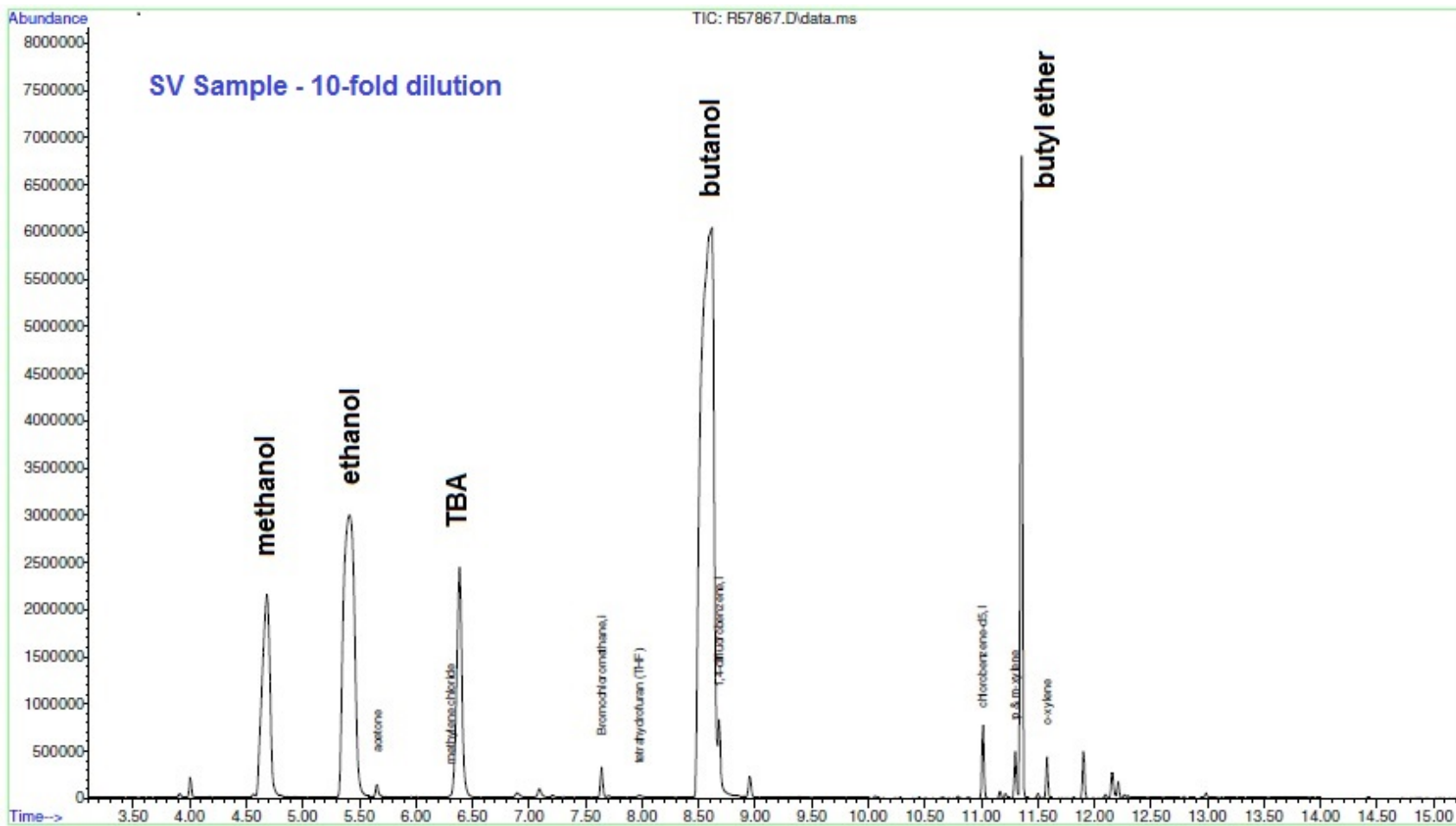


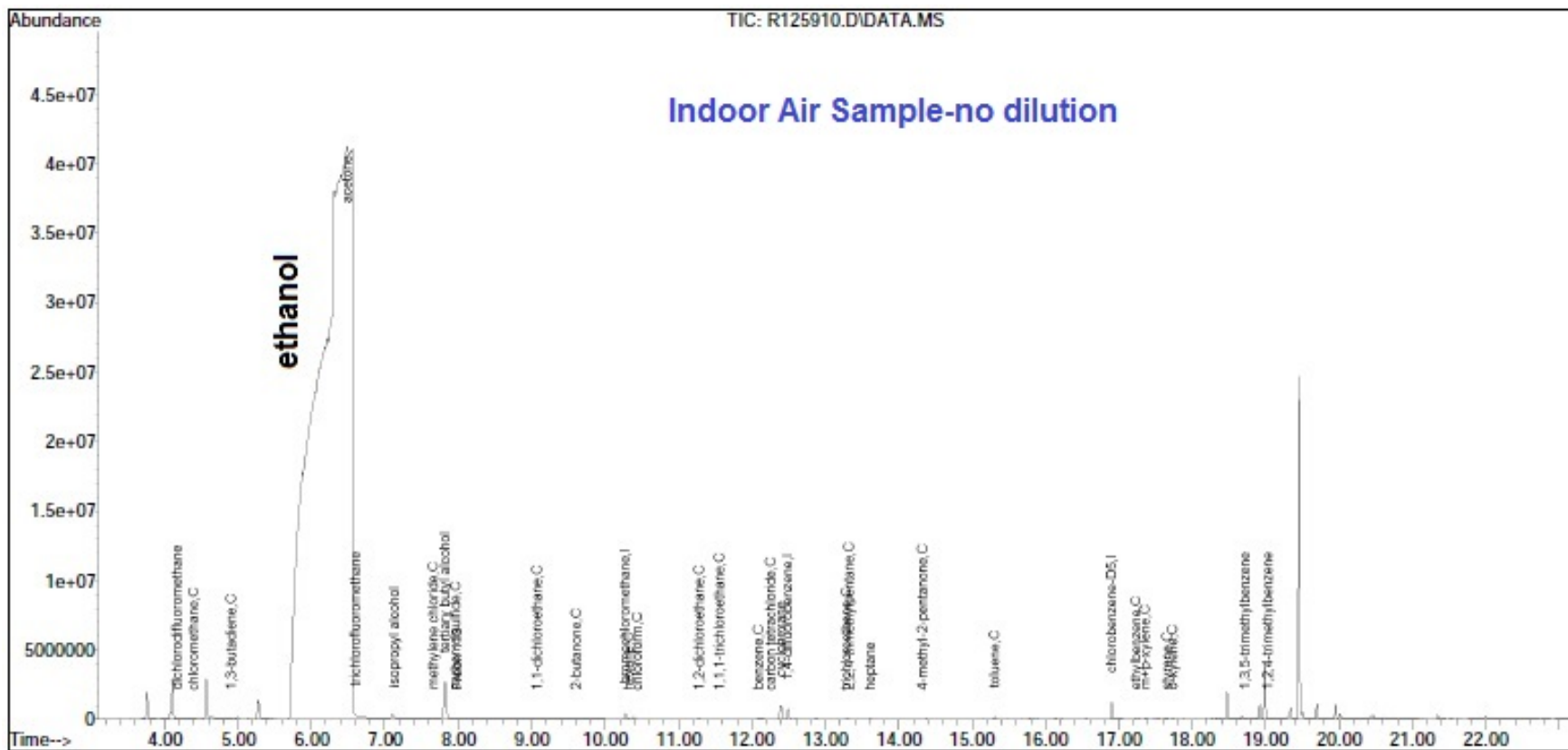
Dilutions due to Alcohols

Sample ID	L13XXXXXX (SV)		L12XXXXXX (SV)		L13XXXXXX (IA)	
Dilution Factor	50-fold		100-fold		none, 400-fold	
Analyte	ppbV	ug/m ³	ppbV	ug/m ³	ppbV	ug/m ³
methanol	2000	2620	115	150	6.6	8.4
ethanol	16000	30000	1820	3430	80500	152000
acetone	150	360	3080	7320	100	238
IPA	ND	ND	10500	25800	3.1	7.7
TBA	1800	5500	ND	ND	81	245









How can you report data to meet Vapor Intrusion screening levels?

- Alcohol concentrations so high - you can't!
- Extend calibration range
- 'E' Flag over calibration results for non target Alcohols
- Full Scan / SIM simultaneous Data Acquisition





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