

# LCS Laboratory Inc.



## Occupational Exposure Limits (OEL)

700 Collip Circle, Unit 218, London ON, N6G 4X8, [info@labconserv.com](mailto:info@labconserv.com), (519) 777-5232

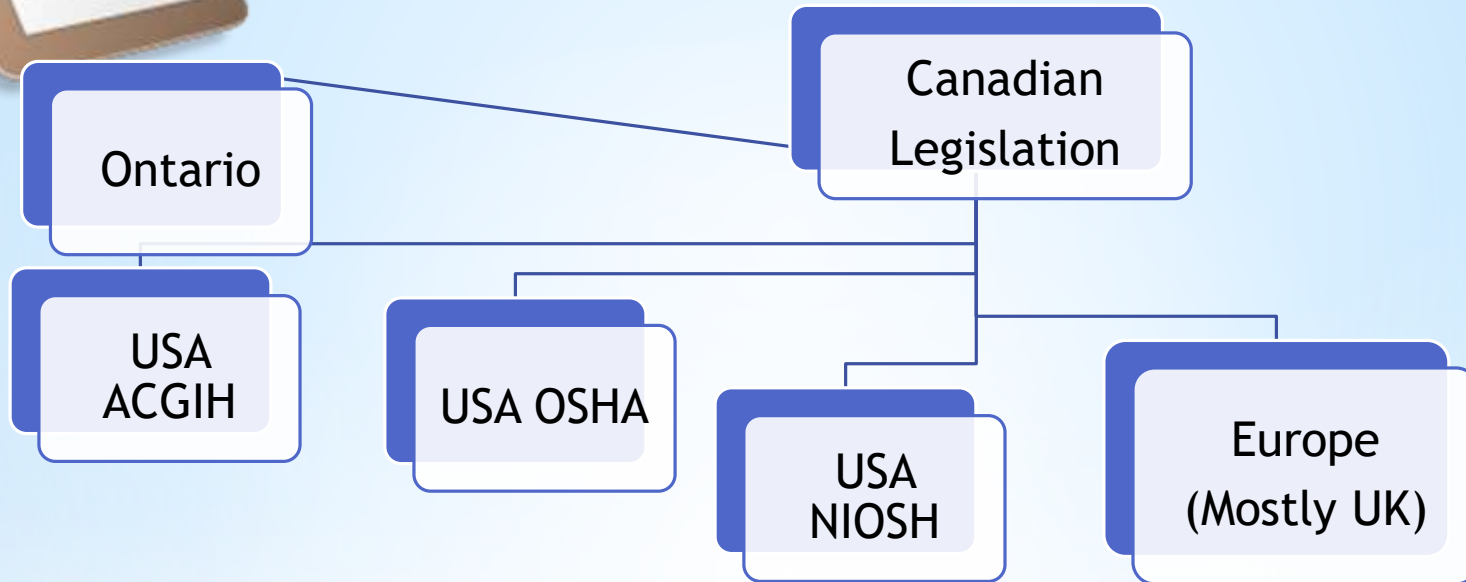


# Occupational Exposure Limits (OEL)

- ✓ Interconnection between different regulations
- ✓ How the OEL's are developed
- ✓ Advanced interpretation of regulation and chemical exposure
- ✓ Use of OEL
- ✓ OEL extras and science



# Hierarchy of Exposure Limits (OEL)



- Ontario and Canadian Federal regulations are **THE LAW**. You must comply
- Ontario limits are generally tougher than the OSHA (USA) limits
- ACGIH limits are considered to be “the best practice”. Ontario Ministry of Labour Occupational Exposure Limits (MOL OEL), are based on ACGIH numbers
- OSHA, NIOSH and International limits are “guidelines” use them if you cannot find a Canadian OEL

# Development of OEL by Government

First level. Statistical study of significance. How many people are potentially exposed ?

Second level. Scientific evidences. Epidemiological studies of historical accidents, and analysis of scientific data. International OELs

Third level. Consultations with safety community and industry

Announcement of future changes to OEL's

New OEL

# Applicability of OEL

## For Ontario Businesses

- Operating in Ontario
- Operating internationally (this depends on the situation)

## OELs are developed for Industry

- Applicable for healthy men and women of age 16-67
- Applicable for businesses operating 8 hours a day, 5 days a week

## Common errors

- OEL cannot be used for assessment of residential exposure
- OEL cannot be changed by industry
- OEL are safety limits, not the comfort limits
- When workers work longer shifts (12 hours?) OEL should be used with caution

# Limitations of OEL

OEL is a compromise

- It should protect people and not to be too tight to destroy economy
- It is influenced by politics

OELs are statistical values

- The values do not take in account your age, gender, or health conditions
- They do not take in account you previous industrial exposure
- They cannot address individual allergies

OELs do not cover all chemicals

- Only about 1000 chemicals are regulated. This doesn't mean that other are safe
- The OELs are not updated immediately





# Terminology of OEL

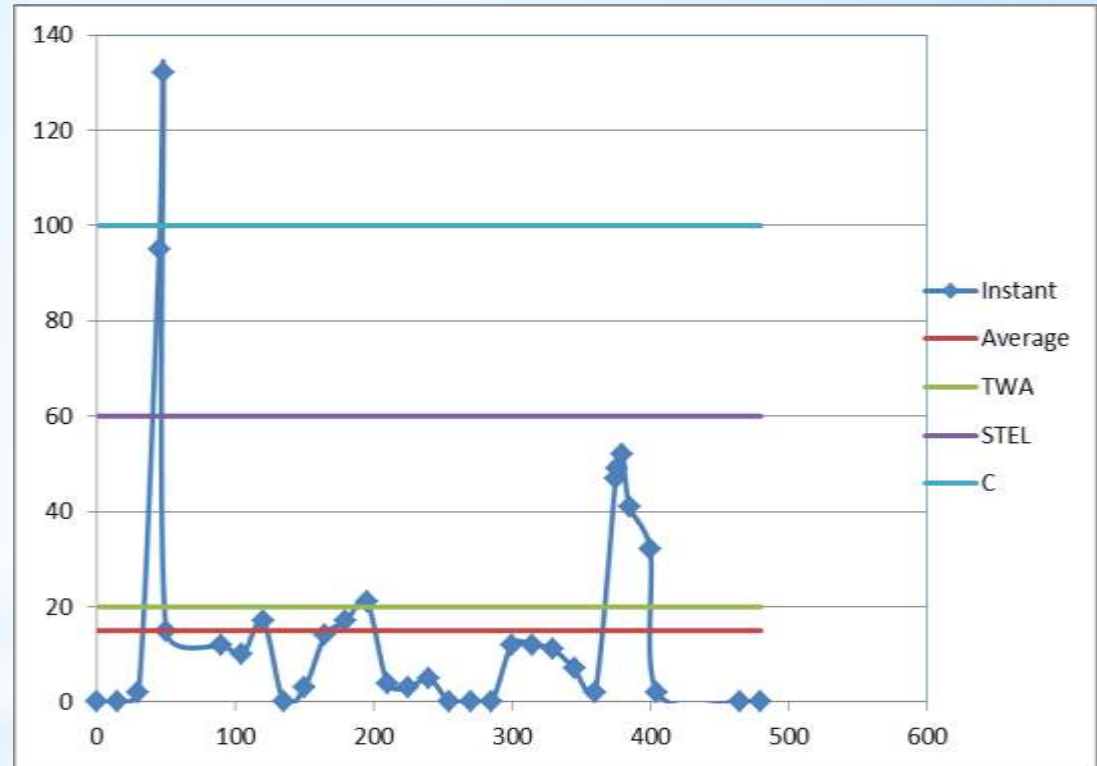
Ontario Ministry of Labour (MOL), Occupational Health and Safety Act. R.R.O. 1990, REGULATION 833

- ✓ Time Weighted Average (TWA)- 8hr time weighed concentration
- ✓ Short Term Exposure Limit (STEL) – 15min time weighed concentration
- ✓ Ceiling limit (C) – concentration should never exceed this limit
- ✓ Dust is reported in  $\text{mg}/\text{m}^3$  (weight of dust per volume of air)
  - Dust can be regulated as total, inhalable (I), respirable (R), or thoracic (T)
- ✓ Vapours are reported in  $\text{ppm}_v$  (volume of vapour per volume of air).
  - In Europe all chemicals are reported in  $\text{mg}/\text{m}^3$

# Different Exposure Scenarios



Acetonitrile vapour  
(ppm)  
Average: 15 ppm  
TWA: 20 ppm  
STEL: 60 ppm  
C: 100 ppm  
 $STEL = 3 * TWA$   
 $C = 5 * TWA$

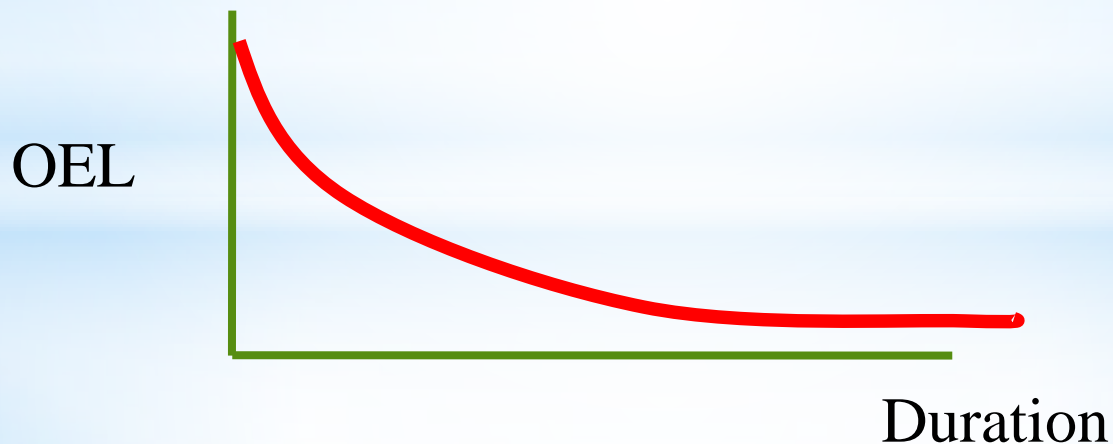




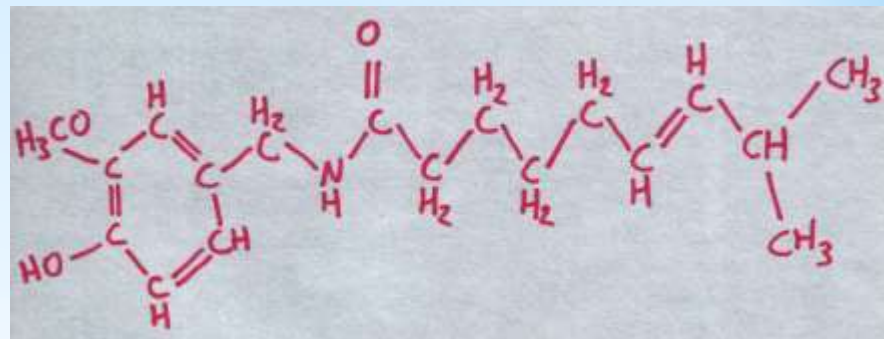
# Why there is a difference between TWA, STEL and C ?



- ✓ We measure concentration, in air (mg/m<sup>3</sup>), but important factor is dosage: how many mg of a chemical was absorbed by your body  
$$\text{Mass} \sim \text{Concentration} * \text{Breathing rate} * \text{Duration}$$
- ✓ For how long does the chemical stay in your body
- ✓ How much time does your body have between exposures to recover



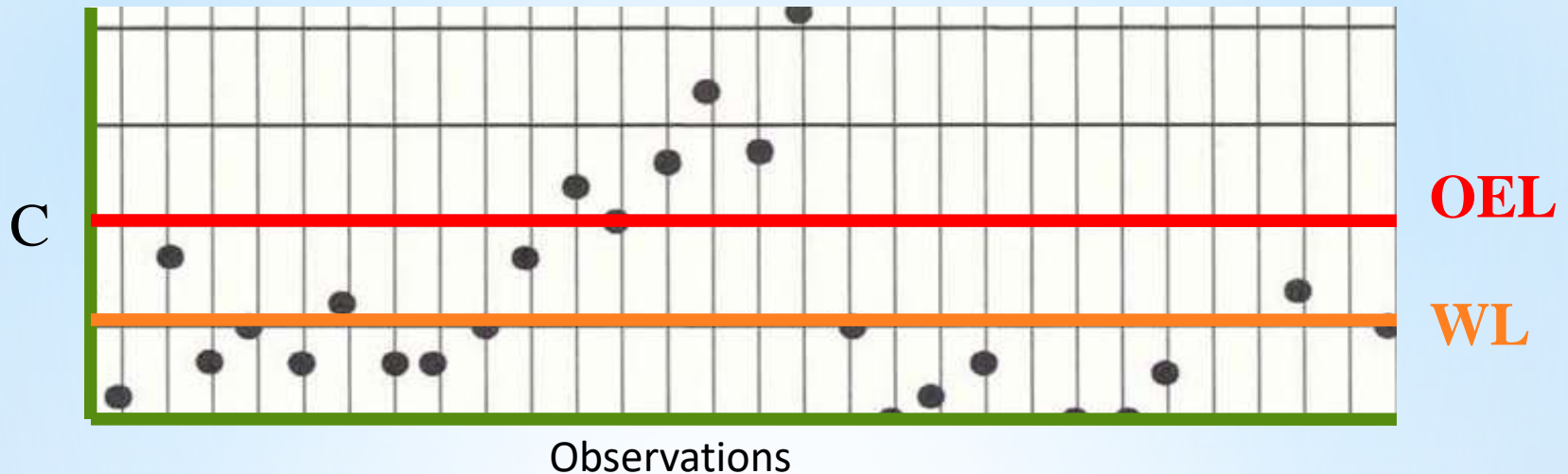
# My chemical is not regulated? Are we safe here?



***No, you are not!!!***

- ✓ Try to find OEL in international regulations
- ✓ Contact manufacturer and ask for “internal safety standard”
- ✓ Develop your own safety criteria
  - ❖ Try to find a regulated homologue and use its OEL
  - ❖ Develop an internal “comfort” standard

# Variability of Measurement



- ✓ There is big deal of variability in any field measurement: at least 2-3 fold
- ✓ Never collect one sample:
  - ❖ If there is an error, you will never find out
  - ❖ Statistically, error of a sing observation is about an order of magnitude
- ✓ If the result does not make sense, try to find the cause and repeat the test
- ✓ If you are 50% below the OEL, one day you might be well above it

# LCS Laboratory Inc.

## *We want to work for you*



For more training materials, or to learn about our services, please visit us at [www.labconserv.com](http://www.labconserv.com)

700 Collip Circle, Unit 218, London ON, N6G 4X8, [info@labconserv.com](mailto:info@labconserv.com), (519) 777-5232