Risk Assessment

Hookston Station Area, Pleasant Hill, California
Public Meeting

Center for Toxicology and Environmental Health, LLC

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www.cteh.com

CTEH® Overview

- Professional Staff
  - 53 Employees (Little Rock, Arkansas; Nashville, Tennessee; Omaha, Nebraska)
  - 8 Ph.D. Toxicologists
  - Medical Doctor (Occupational & Preventive)
  - Ph.D. Senior Chemist with petroleum forensic laboratory
  - 3 Registered nurses
  - 25 Industrial Hygienists/Environmental Scientists
  - 2 Chemical Engineers
  - 3 Information Specialists

CTEH® Overview

- Toxicology Emergency Response Program
  - On-call toxicologist and a dedicated team of responders including a medical doctor, nurses, and air monitoring team.
  - CTEH works with every Class I railroad in the United States and Canada.
  - CTEH® evaluates worker and community exposure potential to chemicals.
- Worker Exposure Response Program
  - Group of toxicologists, a physician, industrial hygienists, nurses, and chemists on-call 24 hours a day
  - Respond to employee concerns regarding potential or actual chemical exposures
- Risk Assessment
  - Prepare risk assessments for industry, States, and the U.S. EPA. CTEH toxicologists have prepared baseline risk assessments or been involved with nineteen Superfund sites.
  - 19 years of experience in conducting risk assessments from New York to California

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Baseline Risk Assessment

- What is a baseline risk assessment?
  - A multi-step process for evaluating theoretical health risk
    - Collect and evaluate environmental study data
    - Evaluate pathways for human exposure to chemicals
    - Examine toxicity of chemicals
    - Characterize theoretical noncancer and cancer risks
  - A decision-support tool
  - Contributes to evaluation and selection of appropriate response alternatives in a Feasibility Study

- Who uses baseline risk assessment?
  - State of California and many other states
    - SF Regional Water Quality Control Board
    - California Office of Environmental Health Hazard Assessment (OEHHA)
      - Proposition 65
  - USEPA
  - Food and Drug Administration

Baseline Risk Assessment

- Can a baseline risk assessment tell me my actual health risk?
  - No. The results of a baseline risk assessment are theoretical estimates of risk.
  - A baseline risk assessment cannot be used to predict if a person will actually be harmed (i.e., it is not based on actual data like cancer risk from cigarette chemicals).
- Why are baseline risk assessments "conservative"?
  - Because of exposure and toxicology uncertainties, risk is overestimated to provide a safety factor
  - "Conservative" means that the results tend to overestimate health risk

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Exposure Assessment

- Who is assumed to be exposed to chemicals in groundwater?

  - Residents assumed to:
    - Breathe solvents potentially released when groundwater used to water lawns and gardens
    - Be exposed to solvents when groundwater is used to fill swimming pools

Exposure Assessment

- Who is assumed to be exposed to chemicals in soil?
  - Commercial workers
    - Ingestion of chemicals in soil
    - Skin contact with chemicals in soil
    - Inhalation of chemicals in soil
  - Construction workers
    - Ingestion of chemicals in soil
    - Skin contact with chemicals in soil
    - Inhalation of chemicals in soil

Exposure Assessment

- Who is assumed to breathe chemicals in indoor air?
  - Commercial workers
  - Residents
- Who is assumed to be exposed to chemicals in Walnut Creek surface water?
  - Residents
    - Assumed to breathe chemicals evaporating from surface water into outdoor air

Toxicity Assessment

- Evaluates noncancer and cancer effects of chemicals
- Identifies toxicity values developed by the State of California and USEPA to calculate theoretical noncancer and cancer risks
  - Theoretical Noncancer Risks
    - Calculated risks are less than one result in no action
  - Theoretical Cancer Risks
    - Calculated risks at or below 1 in 1,000,000 (1E-06) result in no action
    - Calculated risks above 1 in 10,000 (1E-04) require further evaluation (the exposure pathway is considered in the Feasibility Study)

Risk Assessment Summary

Receptor	Exposure Pathway	Theoretical Noncancer Risk	Theoretical Lifetime Cancer Risk
Commercial Workers	Inhalation of VOCs in indoor air	<1 (no hazard)	3.3E-07 to 2.4E-06 (risk from TCE)
	Direct contact with chemicals in soil	<1 (no hazard)	3.1E-04 (most risk from arsenic)
Construction Workers	Direct contact with chemicals in soil	<1 (no hazard)	4.3E-05 (most risk from arsenic)

*Monitoring well on non-commercial property with highest PCE and TCE concentrations

Risk Assessment Summary

Receptor	Exposure Pathway	Theoretical Noncancer Risk	Theoretical Lifetime Cancer Risk
Residents	Inhalation of VOCs in indoor air	Residential wells <1 (no hazard)	1.5E-07 to 3.9E-06 (risk from TCE)
	Inhalation of VOCs released from groundwater during irrigation use	Residential wells <1 (no hazard) *Monitoring well <1 (no hazard)	Residential wells <1E-06 *Monitoring well 6.8E-06 (most risk from TCE)
	Exposure to VOCs released in groundwater used to fill swimming pools	Residential wells <1 (no hazard) *Monitoring well 9.4 (most risk from TCE)	Residential wells <1E-06 *Monitoring well 8.1E-06 (most risk from TCE)
	Inhalation of VOCs evaporating from Walnut Creek	<1 (no hazard)	1.6E-06 (most risk from PCE)

*Monitoring well with highest TCE concentration on non-commercial property

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RISK SCREENING LEVELS FOR TCE IN AIR

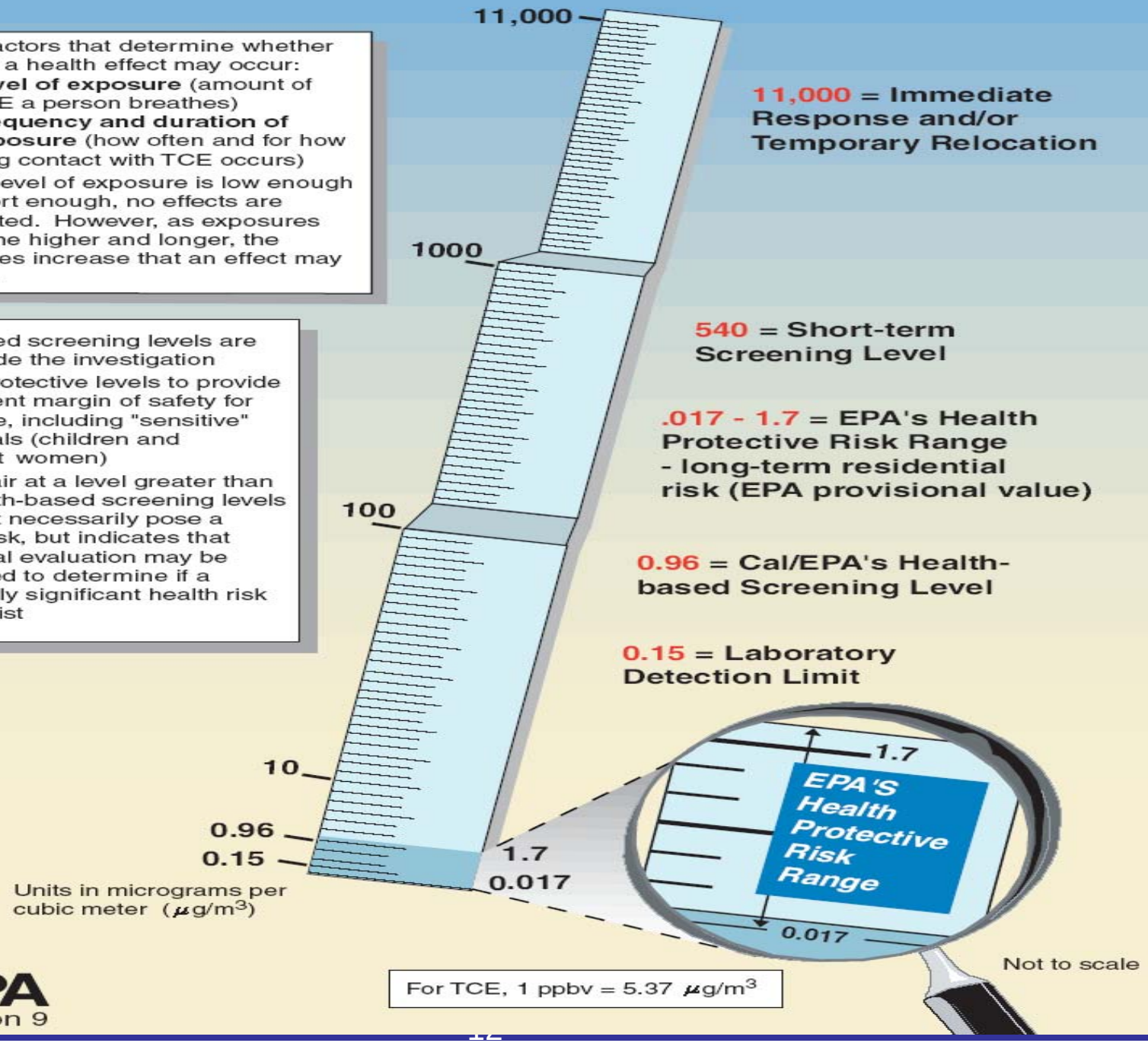
Two factors that determine whether or not a health effect may occur:

- **Level of exposure** (amount of TCE a person breathes)
- **Frequency and duration of exposure** (how often and for how long contact with TCE occurs)

If the level of exposure is low enough or short enough, no effects are expected. However, as exposures become higher and longer, the chances increase that an effect may occur.

Health-based screening levels are used to guide the investigation

- Set at protective levels to provide a sufficient margin of safety for everyone, including "sensitive" individuals (children and pregnant women)
- TCE in air at a level greater than the health-based screening levels does not necessarily pose a health risk, but indicates that additional evaluation may be warranted to determine if a potentially significant health risk could exist



11,000 = Immediate Response and/or Temporary Relocation

540 = Short-term Screening Level

.017 - 1.7 = EPA's Health Protective Risk Range - long-term residential risk (EPA provisional value)

0.96 = Cal/EPA's Health-based Screening Level

0.15 = Laboratory Detection Limit

Units in micrograms per cubic meter ($\mu g/m^3$)

For TCE, 1 ppbv = 5.37 $\mu g/m^3$

EPA Region 9

Questions?